4200 Series
High Definition Dual Frequency Side Scan Sonar System

User's Manual

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Warning—Read This First!

All personnel involved with the installation, operation or maintenance of the equipment described in this manual should read and understand the warnings and recommendations provided below.

Static Sensitive Devices

This equipment contains devices that are extremely sensitive to static electrical charges. Therefore extreme care should be taken when handling them as static electricity may be present on the body and clothing. Normal handling precautions involve the use of anti-static protection materials and grounding straps for personnel.

Radiation

This equipment generates, uses and can radiate radio frequency energy. Therefore if the equipment is not installed properly, it may cause interference with radio communications. The equipment has not been tested for compliance with the appropriate FCC rules designed to provide reasonable protection against such interference when operated in a commercial environment. Therefore when operating the equipment in a residential area, the user may be required to take whatever measures are needed and incur any expenses necessary to eliminate interference; it is the user's responsibility to verify that the system complies with the applicable FCC emission limits.

High Voltages

High voltages that can cause injury or death are present in the tow vehicle and the topside processor. Always use caution when removing the electronics from these devices.

Improper Line Voltage

Operation with improper line voltage may cause serious damage to the equipment. Always ensure that the proper line voltage is used.

Hardware Variations and Compatibility

The 4200 Series High Definition Dual Frequency Side Scan Sonar System contains both standard PC and proprietary hardware. At times EdgeTech may change the standard components due to their availability or performance improvements. Although the component manufacturers and their models and styles may change from unit to unit, replacement components will generally be interchangeable.

EdgeTech will make every effort to see that replacement printed circuit boards are interchangeable and that they use the same software drivers. At times, however, there may be instances where direct replacements do not exist. When this happens, EdgeTech will provide the necessary drivers with the replacement board.

Chassis styles may also vary due to availability and manufacturer model changes. This situation could result in different board placement and cable routings. Therefore all cable routing and part location drawings in this manual should be used as a guide. In addition to cabling, the position and style of controls and indicators may change with different available chassis styles. However, their presence and function will remain the same. Additional controls and indicators may also be added for specials and options.

Preface

We, the employees at EdgeTech, would like to thank you for purchasing a 4200 Series High Definition Dual Frequency Side Scan Sonar System. At EdgeTech it is our policy to provide high quality, cost effective products and support services that meet or exceed your requirements, to deliver them on time and to continuously look for ways to improve them. We take pride in the products we manufacture and want you to be entirely satisfied with your equipment. The information in this manual will get you started. It tells you what you need to set up, to operate and to maintain the 4200 Series High Definition Dual Frequency Side Scan Sonar System.

Purpose of this Manual

The purpose of this manual is to provide the user with information on the setup, operation, care, and maintenance of the EdgeTech 4200 Series High Definition Dual Frequency Side Scan Sonar System. Although this manual encompasses the latest operational features of the 4200 Series High Definition Dual Frequency Side Scan Sonar System, some features of the system may be periodically upgraded. Therefore the information in this manual is subject to change and should be used for reference only.

This manual is divided into the following five sections and three appendices:

Section 1: Overview. Provides some background information about EdgeTech, discusses the advantages of EdgeTech's Full Spectrum chirp technology, and describes the main components of the 4200 Series High Definition Dual Frequency Side Scan Sonar System and the available optional equipment.

Section 2: Specifications. Lists the electrical, mechanical and environmental specifications for the main components of the 4200 Series High Definition Dual Frequency Side Scan Sonar System.

Section 3: Setup, Test and Deployment. Provides instructions on how to set up and test the 4200 Series High Definition Dual Frequency Side Scan Sonar System and how to deploy and tow the tow vehicle.

Section 4: Technical Description. Provides a general description of the hardware elements comprising the main components of the 4200 Series High Definition Dual Frequency Side Scan Sonar System.

Section 5: Maintenance and Troubleshooting. Provides some maintenance recommendations and instructions on how to disassemble and reassemble a tow vehicle and calibrate the compass. Included also are some troubleshooting procedures.

Appendix A: Printer Connections. Lists many of the printers that can be used with the 4200 Series High Definition Dual Frequency Side Scan Sonar System and provides the setup requirements and general specifications for a few of these printers that will provide the best results.

Appendix B: System Backup and Restore. Provides instructions on how to backup and restore the hard drive on the topside processors that use one.

Appendix C: Configuring the ADSL Modems. Provides instructions on how to configure the ADSL modems in the topside processor and the tow vehicle.

Warnings, Cautions and Notes

Where applicable, warnings, cautions and notes are provided in this manual as follows:

WARNING!

Identifies a potential hazard that could cause personal injury or death to yourself or to others.

CAUTION!

Identifies a potential hazard that could be damaging to equipment or could result in the loss of data.

NOTE: **Recommendations or general information that is particular to the material being presented or a referral to another part of this manual or to another manual.**

Liability

EdgeTech has made every effort to document in this manual the 4200 Series High Definition Dual Frequency Side Scan Sonar System accurately and completely. However, EdgeTech assumes no liability for errors or for any damages that result from the use of this manual or the equipment it documents. EdgeTech reserves the right to upgrade features of this equipment and to make changes to this manual without notice at any time.

Warranty

All equipment manufactured by EdgeTech is warranted against defective components and workmanship for a period of one year after shipment. Warranty repair will be done by EdgeTech free of charge. Shipping costs are to be borne by the customer. Malfunction due to improper use is not covered in the warranty and EdgeTech disclaims any liability for consequential damage resulting from defects in the performance of the equipment. No product is warranted as being fit for a particular purpose and there is no warranty of merchantability. This warranty applies only if:

i. The items are used solely under the operating conditions and in the manner recommended in Seller's instruction manual, specifications, or other literature.

ii. The items have not been misused or abused in any manner or repairs attempted thereon. Unless prior authorization from Edgetech customer Service

iii. Written notice of the failure within the warranty period is forwarded to Seller and the directions received for properly identifying items returned under warranty are followed.

iv. The return notice authorizes Seller to examine and disassemble returned products to the extent Seller deems necessary to ascertain the cause for failure.

The warranties expressed herein are exclusive. There are no other warranties, either expressed or implied, beyond those set forth herein, and Seller does not assume any other obligation or liability in connection with the sale or use of said products. Any product or service repaired under this warranty shall be warranted for the remaining portion of the original warranty period only.

Equipment not manufactured by EdgeTech is supported only to the extent of the original manufacturer's warranties.

Software Service Agreement

EdgeTech provides software services free of charge for one year following the purchase of an EdgeTech system. A Software Service Agreement (SSA), which is available for an annual fee, covers these services after the first year. The services are listed below.

The SSA does not address customer specified modifications or enhancements. These services may be ordered separately. Furthermore, EdgeTech software upgrades are meant for the sole use of EdgeTech customers that have purchased a system within a year or have an existing SSA. Any reproduction of EdgeTech supplied software or file sharing is strictly prohibited.

Software Updates and Enhancements

EdgeTech customers can download new software releases with all modifications and enhancements along with user's manual changes from the EdgeTech ftp site. Major software issues, should they occur, will be reported directly to the customer. New software releases consist of the following:

- Software enhancements that are not on the price list
- Software fixes and changes
- Product integration
- Documentation updates to on-line help
- Tests for compatibility with other modules

Software patches consist of software that has undergone the following:

- Minor software enhancements
- Software fixes and changes

Software Performance Report

EdgeTech customers may submit reports using a Software Performance Report (SPR) form. SPR forms are available from EdgeTech. This report may be related to a problem or to an inquiry, or it may be a specific request for a software enhancement. EdgeTech will attend to the SPR at a priority level appropriate to the seriousness of the problem and to the availability of a work-around.

Software Telephone, Facsimile and E-mail Support

The SSA entitles EdgeTech customers to contact EdgeTech Customer Service by telephone, facsimile or e-mail to report a difficulty, to discuss a problem or to receive advice on the best way to perform a task. When contacted, EdgeTech Customer Service will do the following:

- Respond within 24 hours
- Immediately attend to serious problems affecting operations
- Attempt to find an immediate work-around

Software Service Agreement Fee

The SSA covers one year and is renewable upon expiration. For the SSA annual fee, please contact EdgeTech directly. For contact information refer to Customer Service.

Returned Material Authorization

Prior to returning any equipment to EdgeTech a Returned Material Authorization (RMA) number must be obtained. The RMA will help us identify your equipment when it arrives at our receiving dock and track the equipment while it is at our facility. The material should be shipped to the address provided in Customer Service. Please refer to the RMA number on all documents and correspondence as well.

All returned material must be shipped prepaid. Freight collect shipments will not be accepted.

> ***NOTE:*** **The case supplied with the 4200-P Portable Topside Processor is based on the Hardigg Storm case series. This case is not a shipping crate. Please use appropriate packaging material to ensure protection of the processor case when shipping or contact EdgeTech for recommended crates.**

The following steps apply only to material being returned from outside the Continental United States. Follow them carefully to prevent delays and additional costs.

1. All shipments must be accompanied by three copies of your proforma invoice, showing the value of the material and the reason for its return, if the reason is for repair, it must be clearly stated in order to come through customs faster and without duties being charged. Whenever possible, please send copies of original export shipping documents with the consignment.
2. If the value of the equipment is over $1000, the following Shipper's oath must be sent with the invoice. This oath can be typed on the invoice, or on a separate letterhead.

   "I, _____, declare that the articles herein specified are the growth, produce, or manufacture of the United States; that they were exported from the United States from the port of _____, on or about _____; that they are returned without having been advanced in value or improved in condition by any process of manufacture or any other means; and that no drawback, or allowance has been paid or admitted hereof."

   Signed _____
3. If there is more than one item per consignment, a packing list must accompany the shipment. It is acceptable to combine the proforma invoice and packing list as long as the contents of each carton are clearly numbered and identified on the invoice.

4. Small items can be shipped prepaid directly to EdgeTech by FedEx, DHL, UPS, Airborne, etc.
5. If the equipment is the property of EdgeTech (formerly EG&G Marine Instruments Division) please insure for full value.
6. Fax one invoice, packing list, and a copy of the airway bill to EdgeTech upon shipment.

Customer Service

Customer service personnel at EdgeTech are always eager to hear from users of our products. Your feedback is welcome and is a valuable source of information which we use to continually improve these products. Therefore we encourage you to contact customer service to offer any suggestions or to request technical support. They can be reached as follows:

E-mail: service@edgetech.com

Mail: 4 Little Brook Road
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Telephone: (508) 291-0057, Ext 712

Facsimile: (508) 291-2491

For more information please go to www.edgetech.com.

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SECTION 1: Overview

The EdgeTech 4200 Series High Definition Dual Frequency Side Scan Sonar System is a frequency modulated (FM) dual frequency side scan sonar that uses EdgeTech's proprietary Full Spectrum "chirp" and Multi-Pulse technologies to generate high resolution side scan imagery at longer ranges than conventional continuous wave (CW) systems.

The 4200 Series is available in single-pulse (SP) and optional multi-pulse (MP) configurations and in three available dual frequency choices: 100/400 kHz, 300/600 kHz and 300/900 kHz. In both the SP and MP configurations, the two frequencies are transmitted simultaneously. However, in the MP configuration, multi-pulse operation doubles the repetition rate which allows for increased tow speeds up to 9.6 knots while meeting the NOAA and IHO-44S Shallow Water Survey Specification of three pings on a 1-meter cubed target at 100 meters. The optimum configuration and frequency choices are dependent on the application. In both configurations the frequencies are transmitted as linearly swept wide band high energy acoustic pulses, and the received echoes are processed into high signal-to-noise (SNR) images which can be directly displayed as shades of gray or color on a computer monitor and printed on a continuous feed thermal printer. The data can also be stored in real time onto a large capacity hard drive and archived onto a DVD.

1.1 Single-Pulse Versus Mutli-Pulse Performance

Both the single-pulse and multi-pulse configurations of the 4200 Series High Definition Dual Frequency Side Scan Sonar System provide dual simultaneous frequency operation and are designed to accommodate integration of optional sensors. Both configurations also provide excellent signal to noise performance resulting in superb data which are reliably transmitted digitally over coaxial cables as long as 6000 meters. Compared to the SP configuration, however, the MP configuration allows two pulses in the water during each ping cycle, essentially breaking the sound speed barrier by allowing twice the conventional survey vessel speeds to be used for the same coverage. And at conventional survey vessel speeds, twice the data density can be achieved which translates into better target detection and classification capabilities. In addition, use of standard chirp technology makes both the SP and MP configurations far less expensive than similar performing high speed multibeam systems.

1.2 4200 Series Applications

Applications for the 4200 Series High Definition Dual Frequency Side Scan Sonar System are many, a few of which are the following:

- Mine countermeasures
- Hydrographic surveys
- Cable and pipeline surveys
- Channel conditioning/clearance surveys
- Geo-hazard surveys
- Geological/geophysical surveys
- Route surveys
- Archaeological surveys
- Search and recovery

Figure 1-1: 4200 Series High Definition Dual Frequency Side Scan Sonar Systems being Deployed

1.3 Company Background

EdgeTech (formerly EG&G Marine Instruments) traces its history in underwater data acquisition and processing back to 1966. EdgeTech has designed, developed and manufactured products, instruments and systems for the acquisition of underwater data, including marine, estuarine and coastal applications for over 35 years. It has responded to the needs of the scientific, Naval and offshore communities by providing equipment, such as sub-bottom profilers, side scan sonar, acoustic releases and positioning systems that have become standards in the industry. Equally as significant is the company's ability to anticipate and respond to future needs through an active research and development program. Current efforts are focused on the application of cutting edge chirp, DSP and acoustic technology.

1.4 Main System Components

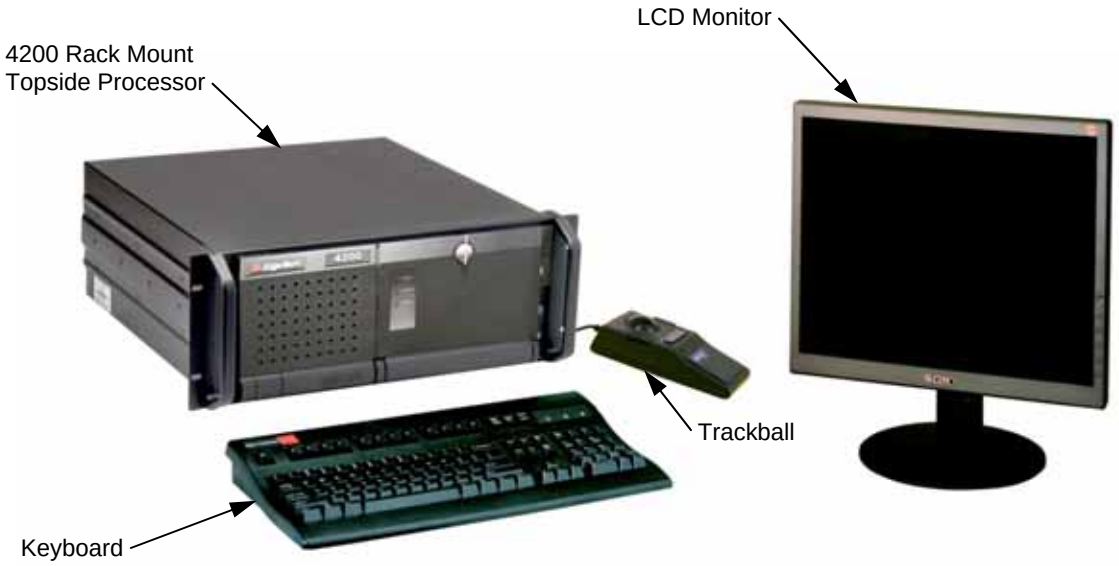
The 4200 Series High Definition Dual Frequency Side Scan Sonar System is composed of three main components: a topside processor, a tow vehicle and a tow cable. Three topside processor configurations and four tow vehicle configurations are available, each with tow cables up to 6000 meters in length (Contact Edgetech for cable type vs. length).

1.4.1 Topside Processors

The 4200 Series Topside Processors provide downlink telemetry to the tow vehicle for sonar control and receives uplink side scan data, sensor data and status information from the tow vehicle for processing, storage and display. The topside processor interfaces with the tow vehicle over a 10/100BaseT connection using asynchronous digital subscriber line (ADSL) modems in both the tow vehicle and the processor. The three available types of 4200 Series Topside Processors are shown in Figure 1-2 and are the following:

- 4200 Rack Mount Topside Processor
- 4200-P Portable Topside Processor
- 701-DL Digital Link

The 4200 Rack Mount and 4200-P Portable Topside Processors each include a computer with Windows XP and Edgetech DISCOVER Side Scan Sonar software preinstalled. The 701-DL Digital Link is used for applications where a user supplied computer running DISCOVER or third-party data acquisition and display software will be used.



4200-Rack Mount Processor with Keyboard, Trackball and LCD Monitor

4200-P Portable Topside Processor with Laptop Computer

701-DL Digital Link

Figure 1-2: 4200 Rack Mount and 4200-P Portable Topside Processors and the 701-DL Digital Link

4200 Rack Mount Topside Processor. The 4200 Rack Mount Topside Processor includes tow vehicle and DC power supplies, a computer with preinstalled Windows XP and DISCOVER Side Scan Sonar software, an ADSL modem, and an Ethernet switch, all within a single 19-inch 4U rack. Included also are a keyboard, a trackball, an LCD monitor, a DVD/RW drive, a 1 TB hard drive for data storage, and a 160-GB hard drive for the operating system. An optional printer can also be connected.

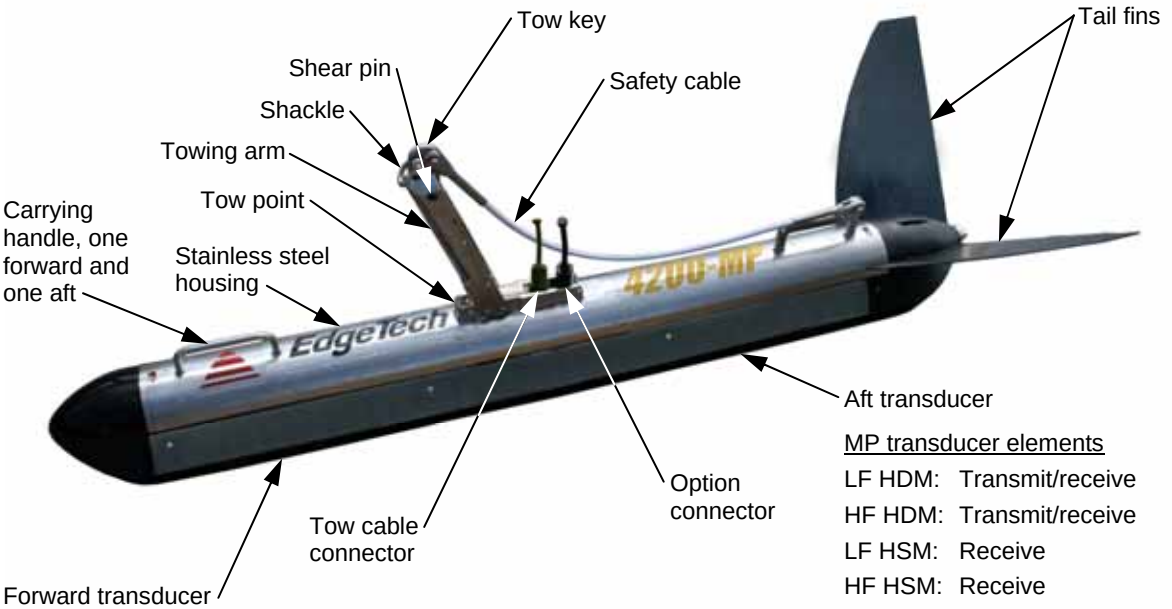
4200-P Portable Topside Processor. The 4200-P Portable Topside Processor includes tow vehicle and DC power supplies, an ADSL modem, an Ethernet switch, and a wireless router, all within a single, compact, rugged, water tight (when closed) enclosure. Included also is a laptop computer with preinstalled Windows XP and DISCOVER Side Scan Sonar software. The 4200-P runs on either AC or DC power and interfaces with the computer over a wired or wireless 10/100BaseT Ethernet connection. The computer can also be stowed inside the 4200-P enclosure when not in use.

701-DL Digital Link. The 701-DL Digital Link includes tow vehicle and DC power supplies, an ADSL modem and an Ethernet switch, all within a single 19-inch 2U rack. The 701-DL interfaces with a user supplied computer over a 10/100BaseT Ethernet connection.

1.4.2 Tow Vehicles

The 4200 Series Tow Vehicles contain the sonar transducer arrays and the electronics required to transmit and to receive the sonar signals, to receive the downlink commands from the topside processor and to provide the uplink side scan data, sensor data and status information to the topside processor. The electronics is contained inside a single housing to which the transducer arrays are attached, and a double O-ring sealed end cap is attached to each end of the housing to seal it, where the aft end cap contains bulkhead connectors for connecting to the transducer arrays. Optional equipment is connected to an 8-pin bulkhead connector on the top of the housing. The housing also includes two convenient carrying handles. The tow vehicle interfaces with the topside processor over a 10/100BaseT Ethernet connection using digital subscriber line (ADSL) modems in both the tow vehicle and the processor. The four available types of 4200 Series Tow Vehicles are shown in Figure 1-3 and are the following:

- 4200-SP Tow Vehicle
- 4200-SP Lightweight Tow Vehicle
- 4200-MP Tow Vehicle
- 4200-MP Lightweight Tow Vehicle

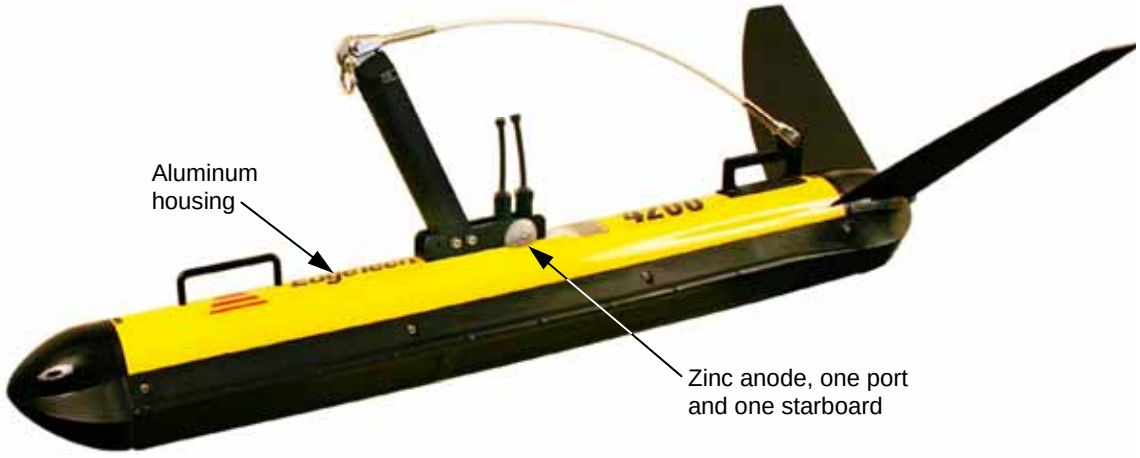


4200-SP/MP Tow Vehicle

MP only transducer elements
LF HDM: Transmit/receive
HF HDM: —
LF HSM: Transmit
HF HSM: Transmit

MP transducer elements
LF HDM: Transmit/receive
HF HDM: Transmit/receive
LF HSM: Receive
HF HSM: Receive

SP transducer elements
LF: Transmit/receive
HF: Transmit/receive



4200-SP/MP Lightweight Tow Vehicle

Figure 1-3: 4200-SP/MP and 4200-SP/MP Lightweight Tow Vehicles

The 4200-SP and 4200-SP Lightweight Tow Vehicles differ only in housing material and depth rating. The 4200-SP housing is made of 316L stainless steel and is depth rated to 2000 meters; the 4200-SP Lightweight housing is made of lighter weight 6061-TS aluminum and is depth rated to 500 meters. Sacrificial zinc anodes are also attached to the lightweight configuration to minimize housing and crevice corrosion. These same basic differences are also true for the 4200-MP and 4200-MP Lightweight Tow Vehicles.

The tow vehicles are each equipped with stabilizer fins and a lead nose weight for hydrodynamic balance. A towing arm is rigidly mounted to a tow point on the top of the tow vehicle housing adjacent to the tow cable and option connectors. The tow cable attaches to a shear pin on the towing arm using a shackle and tow key. Additional mounting holes are provided on the tow point should it be necessary to reposition the towing arm forward or aft to adjust the balance of the tow vehicle. The towing arm also includes a safety release mechanism which causes the shear pin to release the tow point should the tow vehicle hit an obstruction or become snagged. Should this event occur, the tow vehicle will rotate nose down, and a safety cable, which is attached from the tow point to the stern of the tow vehicle, will pull the tow vehicle, stern first, over the obstruction or through the snag.

4200-SP and 4200-SP Lightweight Tow Vehicles. The 4200-SP and 4200-SP Lightweight Tow Vehicles are available with a choice of 100/400 kHz, 300/600 kHz or 300/900 kHz dual linear FM chirp operating frequencies. The tow vehicles include identical port and starboard aft mounted transducer arrays where each includes a high frequency and a low frequency transmit/receive element. The tow vehicle electronics includes four separate transmitters and four separate receivers, and the received sonar signals are digitized and transmitted to the topside processor over an ADSL link using a coax tow cable as long as 6000 meters (contact Edgetech for cable type vs. lengths). Operation is in single pulse (SP) mode only, and therefore the maximum tow vehicle speed that will ensure compliance with the NOAA and IHO-44S Shallow Water Survey Specification of three pings on a 1-meter cubed target with range set at 100 meters is 4.8 knots.

4200-MP and 4200-MP Lightweight Tow Vehicles. The 4200-MP and 4200-MP Lightweight Tow Vehicles enable higher survey speeds while maintaining full bottom coverage. They are available with a choice of 100/400 kHz, 300/600 kHz or 300/900 kHz dual linear FM chirp operating frequencies. The tow vehicles include identical port and starboard forward mounted and aft mounted transducer arrays where each includes a high frequency and a low frequency transmit/receive element. The tow vehicles operate in either High Definition Mode (HDM) dual frequency single pulse operation similar to that performed by the 4200-SP and 4200-SP Lightweight

Tow Vehicles, or High Speed Mode (HSM) dual frequency multi-pulse operation. For the high frequency operation in HDM, the aft transducer arrays both transmit and receive and the forward ones are not used; for low frequency operation, the forward and aft transducer arrays both transmit and receive. For both the high and low frequency operation in HSM, the port and starboard forward transducer arrays transmit and the port and starboard aft transducer arrays receive. Also for HSM operation two pulses are in the water at any one time for each frequency which enables tow vehicle speeds as high as 9.6 knots while still meeting the NOAA and IHO-44S Shallow Water Survey Specification of three pings on a 1-meter cubed target with range set at 100 meters. The tow vehicle electronics includes four separate transmitters and four separate receivers, and the received sonar signals are digitized and transmitted to the topside processor over an ADSL link using a coax tow cable as long as 6000 meters (contact Edgetech for cable type vs. lengths).

1.4.3 Tow Cables

Both Kevlar reinforced and armored tow cables are available separately, terminated at both ends or just at the tow vehicle end. The tow cables are used to connect to and tow the tow vehicle. A Kevlar reinforced tow cable is shown Figure 1-4. Both cable types include a single conductor and a shield. They also include a MCIL6F female wet-pluggable connector on the tow vehicle end and either a MCIL4M male wet-pluggable connector on the topside processor end or an open termination at this end for direct connection to the slip rings of a winch. In addition, a cable grip is included for attaching the tow cable to the towing arm of the tow vehicle.

Figure 1-4: Kevlar Reinforced Tow Cable

To connect a tow cable to the 4200 Rack Mount Topside Processor or the 701-DL Digital Link, a tow cable adapter is required. For the 4200-P Portable Topside Processor, the tow cable connects directly to it. The adapter is a jumper cable that connects from the MCIL4M connector on the tow cable to the 5-pin bulkhead connector on the back panel of

the 4200 Rack Mount Topside Processor or the 701-DL Digital Link. For more details on the available tow cables, refer to “Cables” on page 2-6.

1.5 Optional Equipment

Optional equipment that can be installed and used with a 4200 Series High Definition Dual Frequency Side Scan Sonar System include the following:

- Depressor wing
- Magnetometer
- Acoustic tracking system
- Pressure sensor
- Power loss pinger

NOTE: **The option connector provides 27 VDC @ 1 A maximum.**

1.5.1 Depressor Wing

The Depressor Wing, which is available from EdgeTech and shown in Figure 1-5, allows the tow vehicle to be towed at greater depths and at faster speeds without increasing the length of tow cable in the water. The Depressor Wing attaches to the top of any 4200 Series Tow Vehicle and exerts a downward force on the tow vehicle as it moves through the water, pushing it deeper. The angle of the wing is user adjustable to 0°, 5° and 10° depending on the desired dive angle. Optionally available trim tabs on the back of the wing can be adjusted for fine tuning its performance, and a safety cable is attached to prevent loss of the wing should it become snagged.

Figure 1-5: Depressor Wing

1.5.2 Magnetometer

A magnetometer can be user specified or supplied and is available from a number of manufacturers.

1.5.3 Acoustic Tracking System

An acoustic tracking system, such as an ORE BATS or Trackpoint 3, can be used to continuously provide tow vehicle position. A responder is installed on the tow vehicle and a ship mounted transducer and deck unit are used to receive and process position data.

1.5.4 Pressure Sensor

A stainless steel pressure sensor can be installed in the tow vehicle to provide tow vehicle depth data. This type of pressure sensor is designed for continuous use in a corrosive liquid environment and is available in a 3000-psi pressure range for the 4200-SP and 4200-MP Tow Vehicles and in a 500-psi pressure range for the 4200-SP and 4200-MP Lightweight Tow Vehicles.

1.5.5 Power Loss Pinger

A power loss pinger activates when tow vehicle power is lost *and* the tow vehicle is submerged. Should this event occur, the pinger will continuously transmit an acoustic pulse which can be received by a pinger locator. The pinger is fully self contained in a stainless steel or aluminum housing and includes an internal battery.

1.5.6 Responder

The responder is functions with an optional acoustic tracking system to provide tow vehicle positioning. The tracking system deck unit provides a trigger which is input to the topside processor, and the topside processor outputs the trigger signal to the tow vehicle by combining the signal with the downlink command and uplink sonar data signals.

SECTION 2: Specifications

The specifications for the EdgeTech 4200 Series High Definition Dual Frequency Side Scan Sonar System include electrical, mechanical and environmental characteristics for the main system components as follows:

- 4200 Series Topside Processors
- 4200 Series Tow Vehicles
- Depressor Wing (optionally supplied)
- Cables (optionally supplied)

NOTE: **All specifications are subject to change without notice.**

2.1 4200 Series Topside Processors

The specifications for the 4200 Series Topside Processors are shown in Table 2-1.

Table 2-1: 4200 Series Processor Specifications

	4200 Rack Mount	**4200-P Portable**	**701-DL Digital Link**
Size:	17.8 cm (7 in.) high 43.2 cm (17 in.) wide 48.3 cm (19 in.) deep	18.5 cm (7.3 in.) high 48.8 cm (19.2 in.) wide 38.6 cm (15.2 in.) deep	8.3 cm (3.25 in.) high 48.3 cm (19 in.) wide 43.2 cm (17 in.) deep
Weight:	19.5 kg (43 lb)	13 kg (30 lb) (w/laptop computer) 10 kg (22 lb) (w/o laptop computer)	6.4 kg (14 lb)
Case construction:	Aluminum 19-inch rack mount	Waterproof high impact ABS plastic with purge valve	Aluminum 19-inch rack mount
Shipping container type:	Sealed high impact polyurethane case	Carton	Carton
Shipping container size:	71.1 cm (28 in.) high 66.0 cm (26 in.) wide 50.8 cm (20 in.) deep	63.5 cm (25 in.) high 53.3 cm (21 in.) wide 53.3 cm (21 in.) deep	61 cm (24 in) high 61 cm (24 in wide 30.5 cm (12 in) deep

	4200 Rack Mount	4200-P Portable	701-DL Digital Link
Shipping weight:	47.7 kg (105 lb)	21.8 kg (48 lb)	11.3 Kg (25 lb)
Operating Temperature:	0–45°C (32–113°F)	0–40°C (32–104°F)	0–40°C (32–104°F)
Storage temperature:	-30–70°C (-22–158°F)	-20–60°C (-4–140°F)	-20–60°C (-4–140°F)
Operating relative humidity:	0–95% (non condensing)	0–90% (non condensing)	0–80% (non condensing)
Nonoperating storage relative humidity:		0–100%	
Input voltage:	90–260 VAC, 50/60 Hz, auto switching	90–260 VAC, 50/60 Hz, auto switching or 36 VDC	90–260 VAC, 50/60 Hz, auto switching
Input power:		18–36 VDC	
Power to tow vehicle:		400 VDC	
Processor:	Intel P4, 2.4 GHz	Intel Core, 2 GHz	—
Memory:	512 MB	2 GB	—
Data storage:	DVD/RW drive 1-TB hard drive (data) 160-GB hard drive (OS)	150 GB hard drive	—
Operating system:	Windows XP	Windows XP	—
Application software:	DISCOVER 4200	DISCOVER 4200	—
Display:	21-inch LCD monitor	Laptop 15.4-inch LCD	—
Keyboard:	High impact industrial	Laptop keyboard	—
Pointing device:	High impact industrial trackball	Laptop mouse pad	—
Wireless Ethernet:	—	Centrino 802.11b	—
External trigger:	5 VDC TTL positive or negative leading edge triggered, selectable in DISCOVER		
I/O ports:	(1) Ethernet (2) RS-232 (3) USB (1) Parallel (2) PS2 (1) SVGA	(1) Ethernet (2) RS-232 (3) USB (1) External keyboard (2) External mouse (1) External monitor	(1) Ethernet (1) Trigger

2.2 4200 Series Tow Vehicles

The specifications for the 4200 Series Tow Vehicles are shown in Table 2-2.

Table 2-2: 4200 Series Tow Vehicle Specifications

	4200-SP/MP Tow Vehicle	4200-SP/MP Lightweight Tow Vehicle
Size:	125.6 cm (49.5 in.) long 11.4 cm (4.5 in.) diameter	125.6 cm (49.5 in.) long 11.4 cm (4.5 in.) diameter
Weight in air:	48 kg (105 lb)	30 kg (66 lb)
Weight in salt water:	36 kg (80 lb)	18 kg (40 lb)
Construction:	Stainless steel	Aluminum
Maximum tow cable length:	6000 m (19,680 ft) Contact Edgetech for cable type vs. length.	6000 m (19,680 ft) Contact Edgetech for cable type vs. length.
Depth rating:	2000 m (6560 ft)	500 m (1640 ft)
Tow cable type:	Coaxial	Coaxial
Shear pin type:	8 mm (5/16 in.) Delrin rod	6.35 mm (1/25 in.) Delrin rod
Shear force:	544 kg (1200 lb)	409 kg (900 lb)
Frequencies:	100/400 kHz 300/600 kHz 300/900 kHz	
Modulation:	Full spectrum chirp frequency modulated pulse with amplitude and phase weighting	
Expd Operating ranges (per side):	500 m (100 kHz) 230 m (300 kHz) 150 m (400 kHz) 120 m (600 kHz) 75 m (900 kHz)	
Output pulse energy:	4 j (100 kHz) 3 j (300 kHz) 2 j (400 kHz) 1 j (600 kHz) 1 j (900 kHz)	
Pulse length:	Up to 20 ms (100 kHz) Up to 12 ms (300 kHz) Up to 10 ms (400 kHz) Up to 5 ms (600 kHz) Up to 3 ms (900 kHz)	
Digital link:	4 Mbits/sec (typical), 4 channels of side scan data plus sensor data	

4200-SP/MP Tow Vehicle

4200-SP/MP Lightweight Tow Vehicle

Across track resolution:	8 cm (100 kHz) 3 cm (300 kHz) 2 cm (400 kHz) 1.5 cm (600 kHz) 1 cm (900 kHz)	
Along track resolution:	5 m @ 200 m (100 kHz) 1.3 m @ 150 m (300 kHz) 0.6 m @ 100 m (400 kHz) 0.45 m @ 100 m (600 kHz) 0.18 m @ 50 m (900 kHz)	
Horizontal beam width (4200-SP):	1.50° (100 kHz) 0.50° (300 kHz) 0.40° (400 kHz) 0.26° (600 kHz) 0.20° (900 kHz)	
Horizontal beam width (4200-MP):	HDM 0.64° (100 kHz) 0.28° (300 kHz) 0.30° (400 kHz) 0.26° (600 kHz) 0.20° (900 kHz)	HSM 1.26° (100 kHz) 0.54° (300 kHz) 0.40° (400 kHz) 0.34° (600 kHz) 0.30° (900 kHz)
Transducer array depression angle (4200-SP):	26° downward	
Transducer array depression angle (4200-MP):	26° downward	
Dynamic range:	24 bits	
Vertical beam width:	50°	
Maximum towing speed while meeting NOAA and IHO-44S specifications of 3 pings on a 1-meter cubed target at 100 meters (4200-SP):	4.8 knots	
Maximum towing speed while meeting NOAA and IHO-44S specifications of 3 pings on a 1-meter cubed target at 100 meters (4200-MP):	HDM 4.8 knots	HSM 9.6 knots

4200-SP/MP Tow Vehicle

4200-SP/MP Lightweight Tow Vehicle

Maximum safe towing speed:	12 knots
Operating temperature:	0–45°C (32–113°F)
Heading accuracy:	<1.5° RMS
Heading resolution:	0.1°
Pitch and roll accuracy:	±0.4°
Pitch and roll resolution:	0.1°
Pitch and roll repeatability:	0.2°
Optional sensor port:	RS-232
Options:	Depressor wing Magnetometer Acoustic tracking system Pressure sensor Temperature sensor Power loss pinger

2.3 Depressor Wing

The specifications for the optionally supplied Depressor Wing are shown in Table 2-3.

Table 2-3: Depressor Wing Specifications

Size:	61.0 cm (24 in.) long 72.4 cm (28.5 in.) wide 34.9 cm (13.75 in.) high
Weight in air:	12.7 kg (28 lb)
Weight in salt water:	7.7 kg (17 lb)
Depressive force:	85 lb @ 5 knots 255 lb @ 10 knots 590 lb @ 15 knots
Depression angle:	0°, 5° or 10°, user adjustable

2.4 Cables

Outline drawings of the optionally available Kevlar reinforced and armored tow cables, tow cable adapter and test cable are listed below along with their corresponding figure numbers.

- Figure 2-1 on page 2-7: Kevlar Reinforced Tow Cable
- Figure 2-2 on page 2-8: Armored Tow cable, Kellems Grip, Terminated Both Ends
- Figure 2-3 on page 2-9: Armored Tow Cable, Kellems Grip, Unterminated Topside
- Figure 2-4 on page 2-10: Armored Tow Cable, PMI Grip, Unterminated Topside
- Figure 2-5 on page 2-11: Tow cable adapter
- Figure 2-6 on page 2-12: Test cable
- Figure 2-7 on page 2-13: AC Power Cable
- Figure 2-8 on page 2-14: DC Power/Ethernet Cable

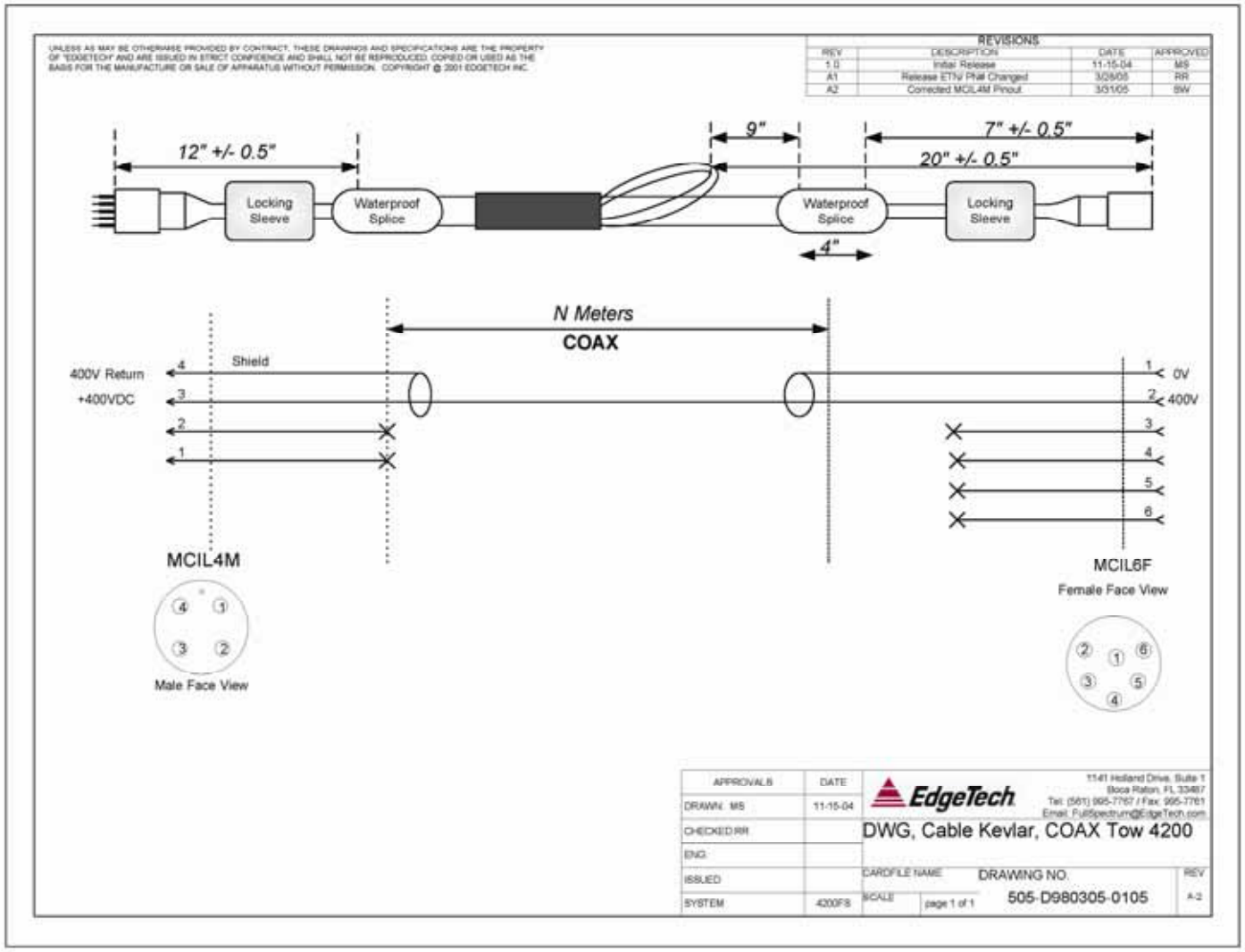


Figure 2-1: Kevlar Reinforced Tow Cable

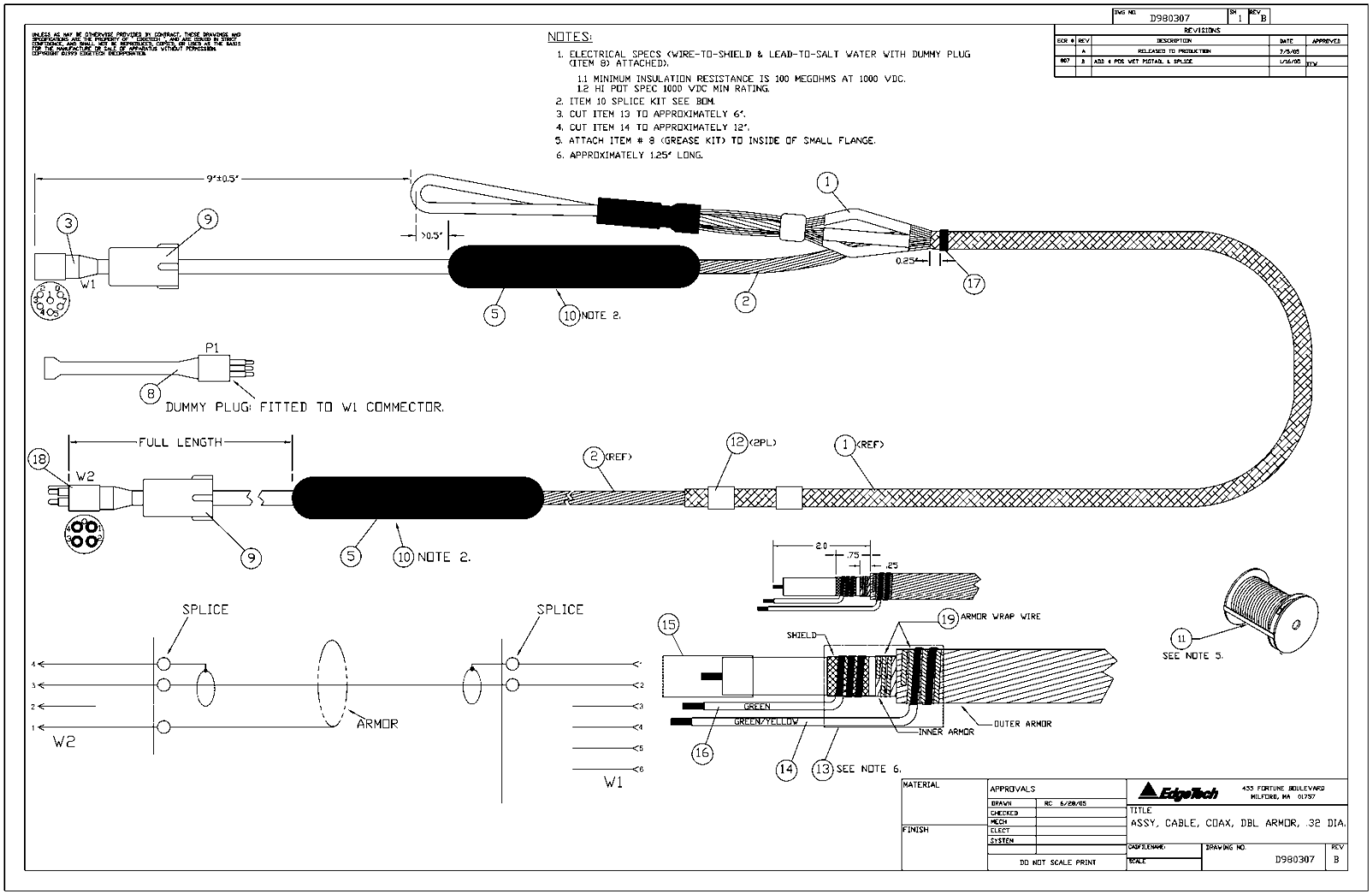


Figure 2-2: Armored Tow Cable, Kellems Grip, Terminated Both Ends

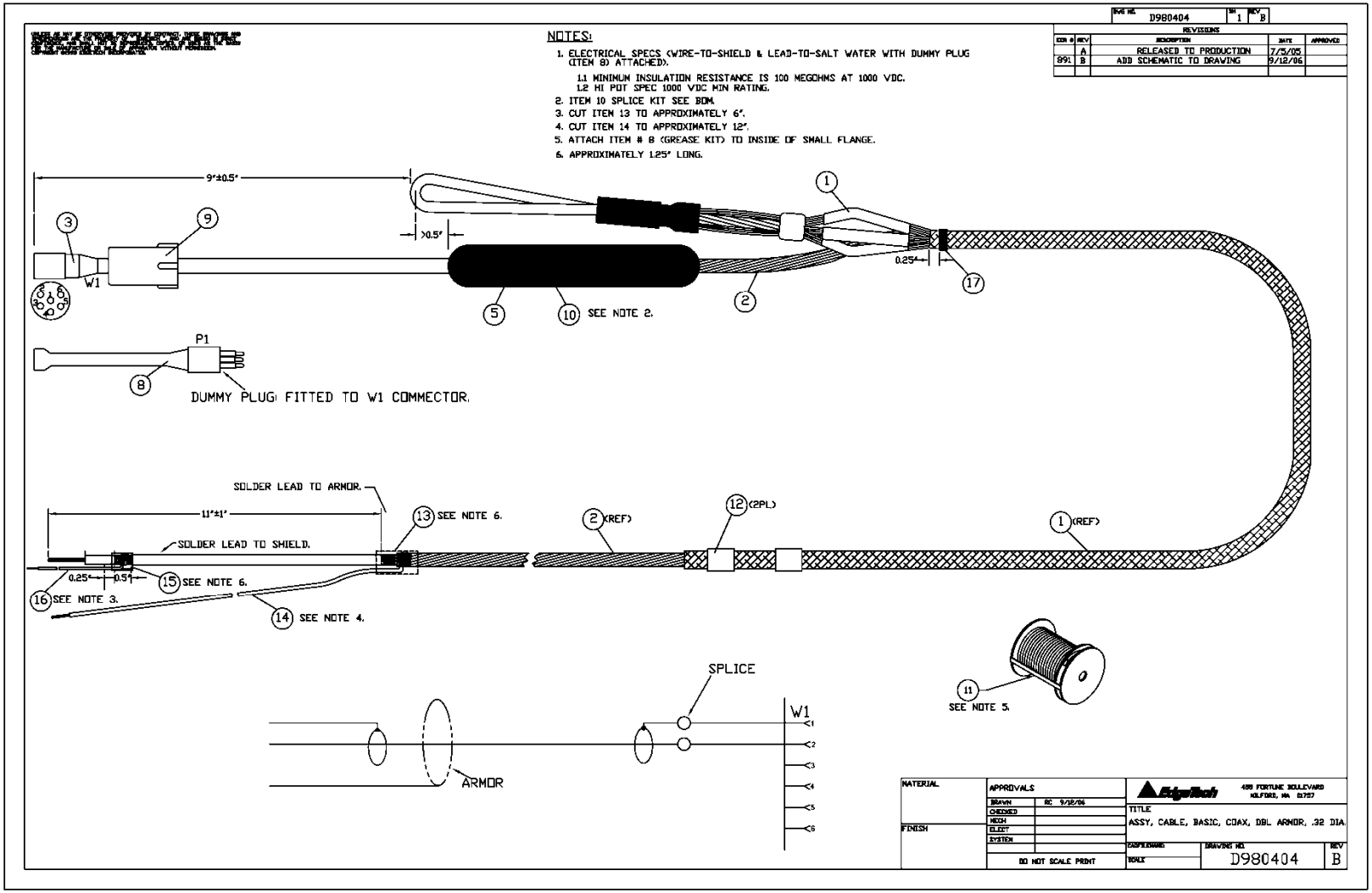


Figure 2-3: Armored Tow Cable, Kellems Grip, Unterminated Topside

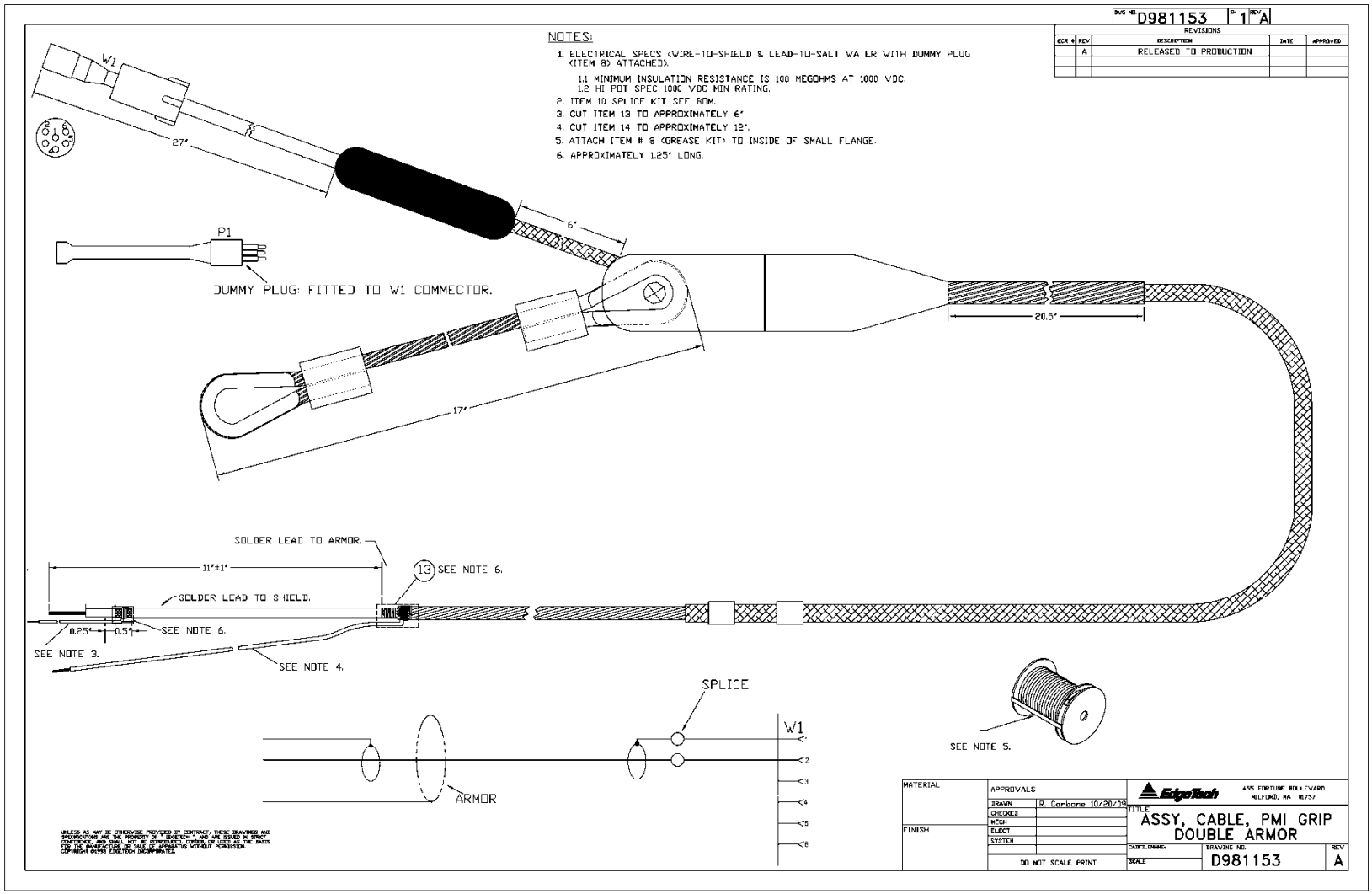


Figure 2-4: Armored Tow Cable, PMI Grip, Unterminated Topside

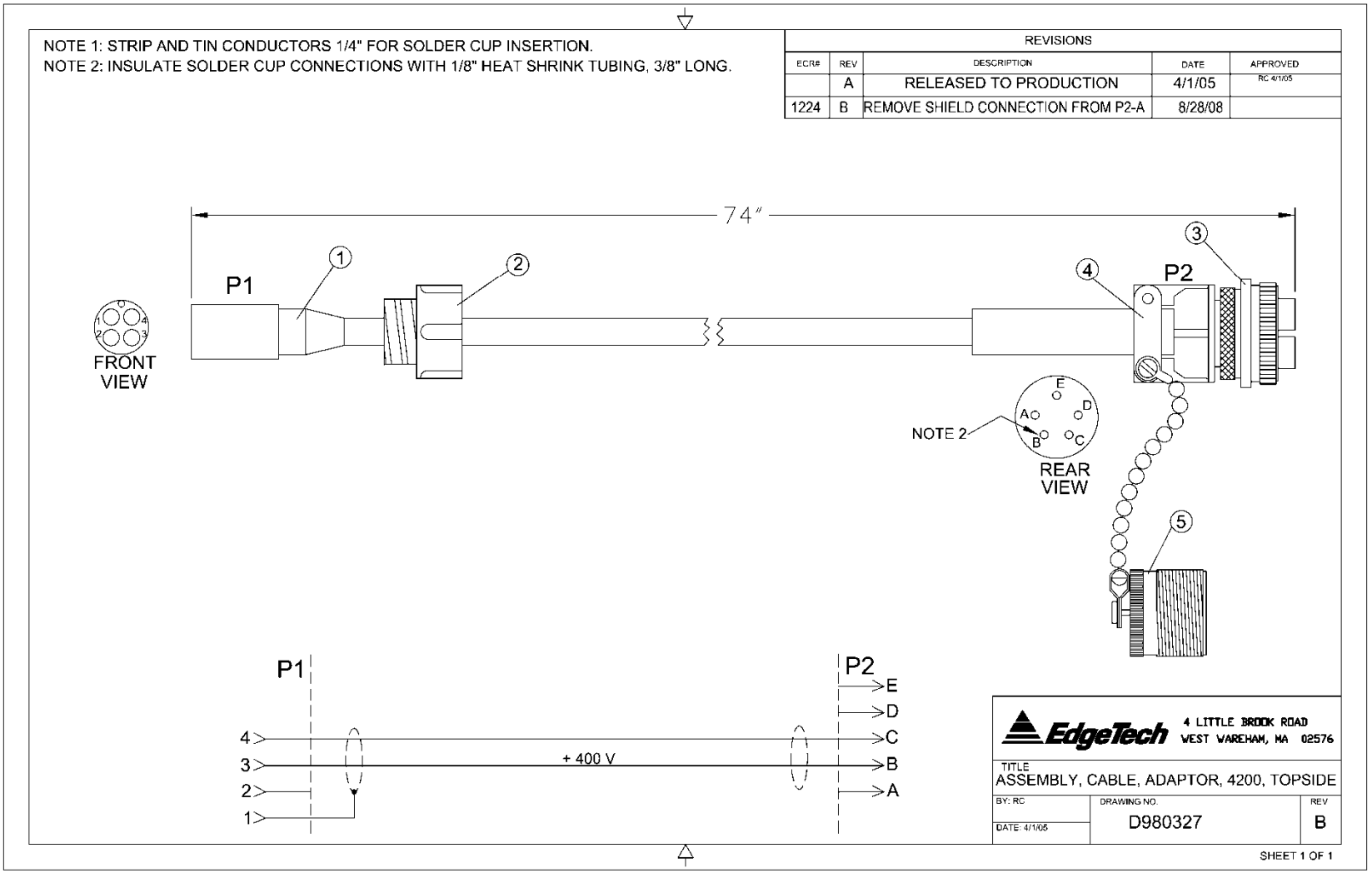


Figure 2-5: Tow Cable Adapter

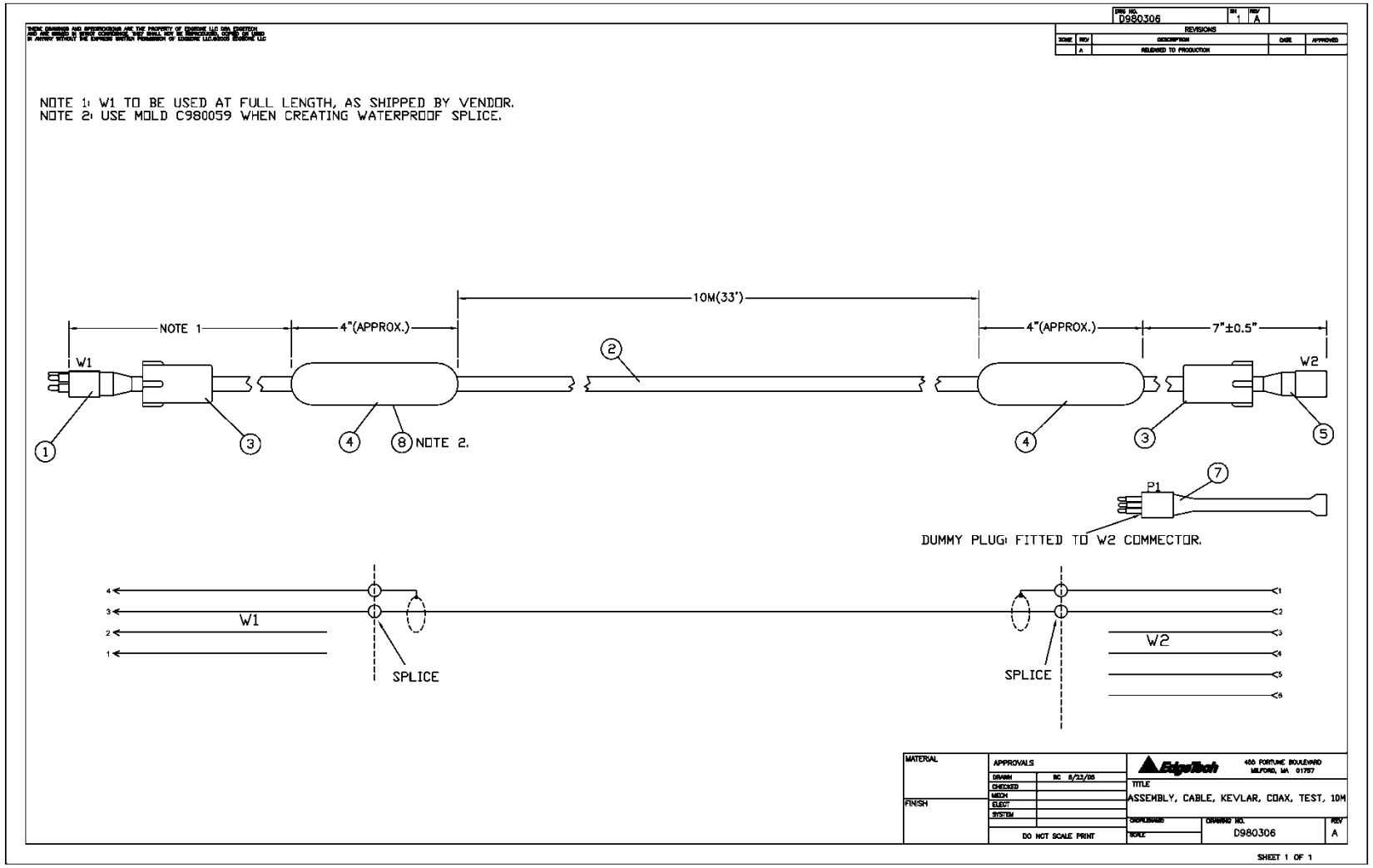


Figure 2-6: Test Cable

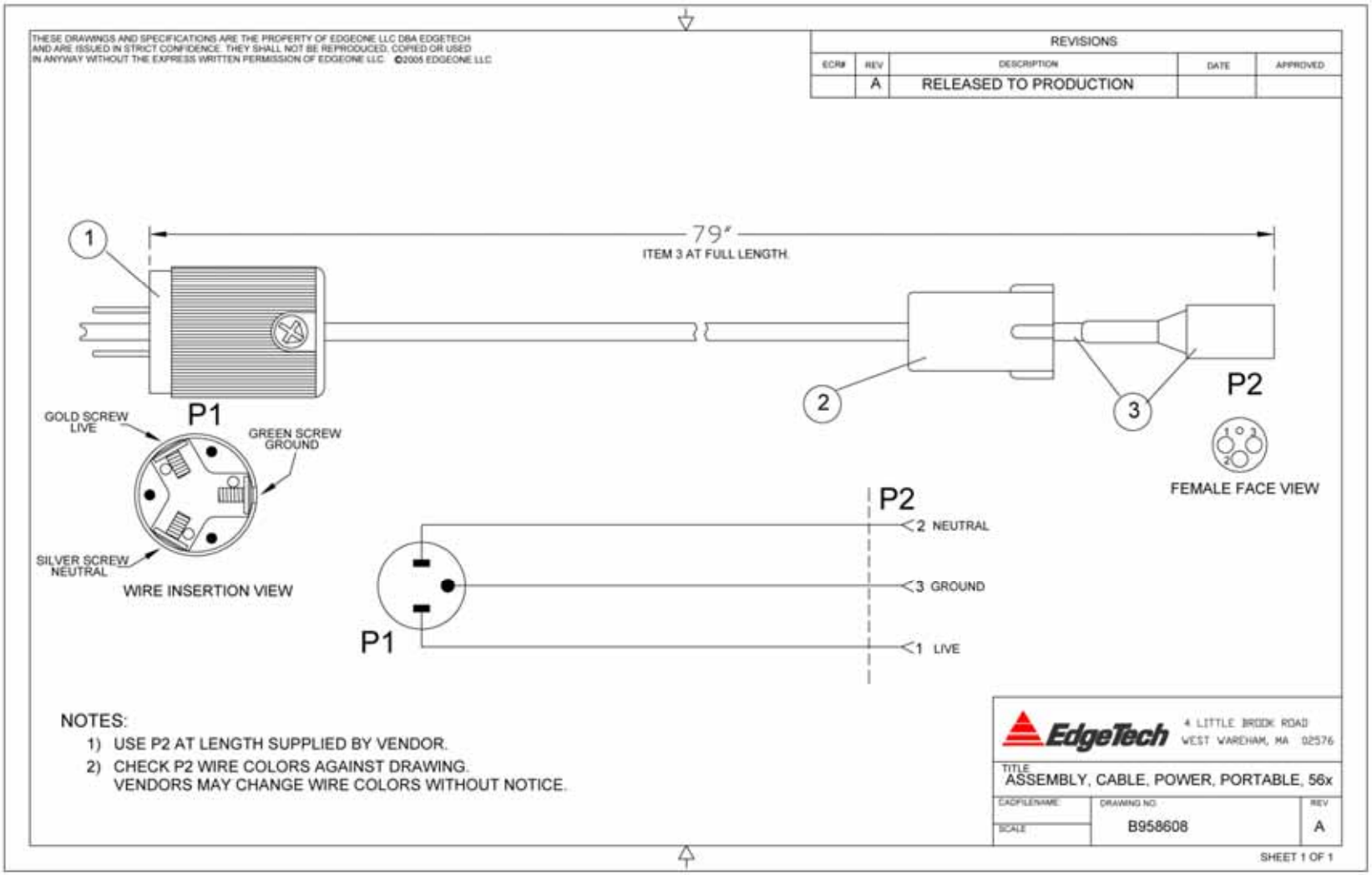


Figure 2-7: AC Power Cable

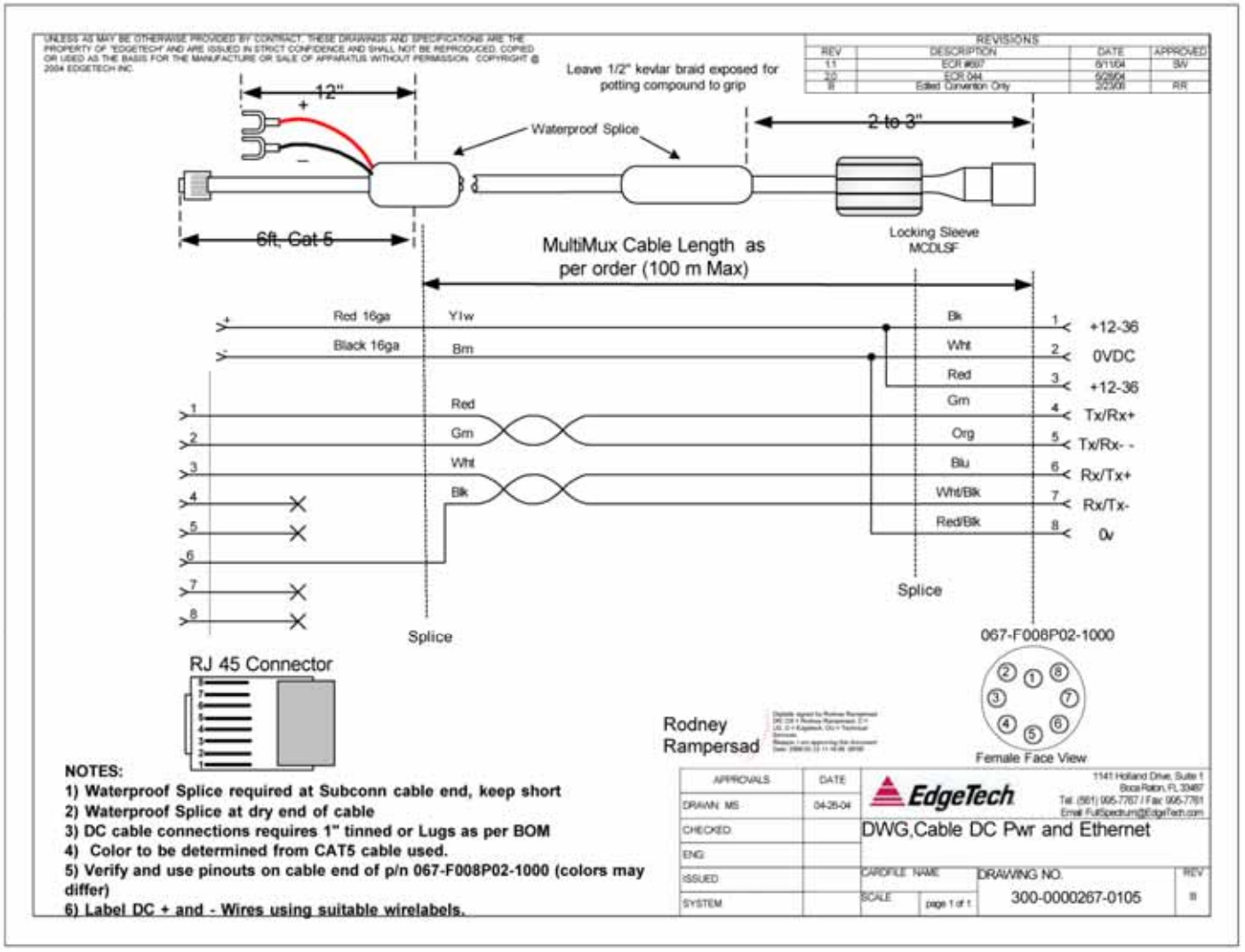


Figure 2-8: DC Power/Ethernet Cable

SECTION 3: Setup, Test and Deployment

Setup and test of the EdgeTech 4200 Series High Definition Dual Frequency Side Scan Sonar System encompasses unpacking, inspecting and connecting the system components, including an optional printer; connecting a navigation system and external sonar systems if required; activating the system; and verifying operation using the EdgeTech DISCOVER software. This section provides instructions on how to perform these tasks and how to deploy, tow and recover the tow vehicle.

3.1 Unpacking and Inspection

The tow vehicle is shipped in a wooden crate. A 4200 Rack Mount Topside Processor is shipped in a reusable heavy duty transport case. A 4200-P Portable Topside Processor and a 701-DL Digital Link are each shipped in a heavy duty shipping box. Included also are all the supplied setup cables and documentation, all shipped in heavy duty shipping boxes. Before unpacking the system components, inspect the shipping containers for any damage. Report any damage to the carrier and to EdgeTech. If the shipping containers appear free of damage, carefully unpack the components and inspect them for damage. Also check the packing list and verify that all the items on the list are included. Again, if any damage is found, report it to the carrier and to EdgeTech. If any items are missing, immediately contact EdgeTech. Do not install or operate any equipment that appears to be damaged. Although the items shipped will vary, depending on the customer requirements, the 4200 Series High Definition Dual Frequency Side Scan Sonar System typically includes, as a minimum, the items listed below for each topside processor.

For a system that includes a 4200 Rack Mount Topside Processor:

- 4200 Rack Mount Topside Processor
- 4200-SP, 4200-MP, 4200-SP Lightweight or 4200-MP Lightweight Tow Vehicle
- Monitor
- Keyboard
- Trackball
- AC power cords (2)
- Video cable
- Tow cable adapter
- Software CDs
- Manuals

For a system that includes a 4200-P Portable Topside Processor:

- 4200-P Portable Topside Processor
- 4200-SP, 4200-MP, 4200-SP Lightweight or 4200-MP Lightweight Tow Vehicle
- Laptop computer
- Laptop computer power supply
- AC power cable
- DC power/Ethernet cable
- Software CDs
- Manuals

For a system that includes a 701-DL Digital Link:

- 701-DL Digital Link
- 4200-SP, 4200-MP, 4200-SP Lightweight or 4200-MP Lightweight Tow Vehicle
- AC power cord
- Tow cable adapter
- Ethernet patch cable
- Software CDs
- Manuals

In addition to the listed components, the following optional items may be included:

- Tow cable
- Test cable

After unpacking the system components, be sure to safely store the shipping containers, including any packing materials, for later use. When transporting or storing the system, all items should be packed in their original shipping containers in the same manner in which they were originally shipped, and always store the system in a dry environment when not in use.

3.2 Power Requirements

The power requirements for the 4200 Series Topside processors are 180–140 or 90–260 VAC, 50/60 Hz and are auto switching. The 4200-P Portable Topside Processor can also be powered with 18–36 VDC. Refer to Table 2-1 on page 2-1 for more specific power requirements.

3.2.1 Use of an Uninterruptable Power Supply

The AC power source should be continuously free of high amplitude, high frequency transients, as this type of interference could cause degraded performance or damage to the equipment. An uninterruptable power supply (UPS) with power surge protection is recommended for powering the equipment. However, whether or not a UPS is used, the AC power source should never be the same as that being used to power electric motors, such as pumps and winches, on the survey vessel. In addition, switching type battery chargers or DC to AC converters with square wave outputs also should not be used.

3.2.2 Changing to a Non-US Power Plug

An AC power cord is provided for connecting the Deck Unit to a standard U.S. 3-pronged outlet. For non-U.S. power outlets you can modify this cord by cutting off the 3-pronged plug and attaching the appropriate plug. Refer to Table 3-1 for connection information.

Table 3-1: AC Power Cord Wiring

AC POWER CORD WIRE COLOR	FUNCTION
Black	AC line
White	AC neutral
Green	Earth ground

NOTE: **The topside processor is shipped configured for the end user's country voltage requirements.**

3.3 Navigation Interface

The 4200 Series High Definition Dual Frequency Side Scan Sonar System accepts all standard National Marine Electronics Association (NEMA) 0183 message sentence formats from a connected global positioning system (GPS) or integrated navigation system.

3.4 Locating the Topside Processor

The 4200 Rack Mount Topside Processor and the 701-DL Digital Link should be located and set up in a dry, sheltered area that is protected from weather and water spray and where the temperature is consistently between 0°C and 40°C (32°F and 104°F). The 4200-P Portable Topside Processor can be located in a wet environment if the cover is kept closed. However, in all cases avoid areas of direct sunlight, especially in tropical environments, as heat buildup could occur and viewing LCD displays and status indicators could be difficult. The location should also enable direct communications with the deck crew that is handling the tow vehicle. Secure the topside processor in place, using tie-downs if necessary, near the required AC power source. If you are mounting the 4200-Rack Mount Topside Processor in a 19-inch rack other than the supplied rack mount enclosure, or if you are mounting the 701-DL Digital Link in a 19-inch rack, ensure that there is ample room behind the rack for connecting the cables. Support the components inside the rack using appropriate mounting brackets and secure the front panels using standard 19-inch rack front panel mounting hardware.

3.5 Topside Processor Controls and Indicators

The 4200 Rack Mount Topside Processor and the 701-DL Digital Link include controls and indicators on the front and back panels. The 4200-P Topside Processor includes these items on a side panel. In addition, the 4200 Rack Mount Topside Processor includes a DVD drive behind an access panel that is located on the front of the processor.

3.5.1 4200 Rack Mount Topside Processor Controls and Indicators

The 4200 Rack Mount Topside Processor includes controls and indicators on the front and back panels as shown in Figure 3-1 and Figure 3-2. Also shown in Figure 3-2 is the access panel and the DVD drive.

The 4200 Rack Mount Topside Processor controls and indicators are the following:

POWER: Rocker switch. Switches AC power to the 4200 Rack Mount Topside Processor. This switch can be left in the on position at all times.

SYSTEM POWER: Push button toggle switch. Turns the 4200 Rack Mount Topside Processor on.

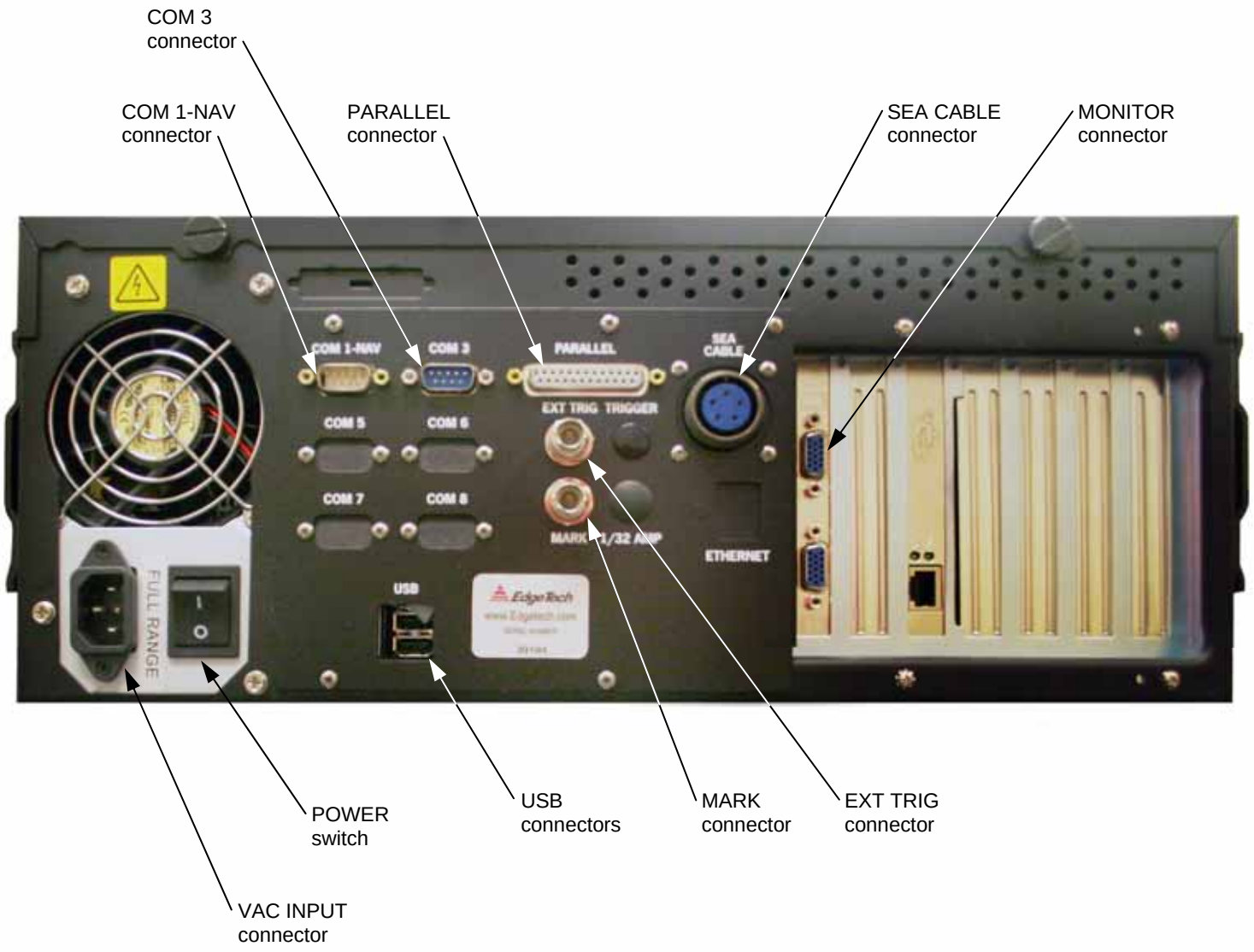


Figure 3-1: 4200 Rack Mount Topside Processor Back Panel

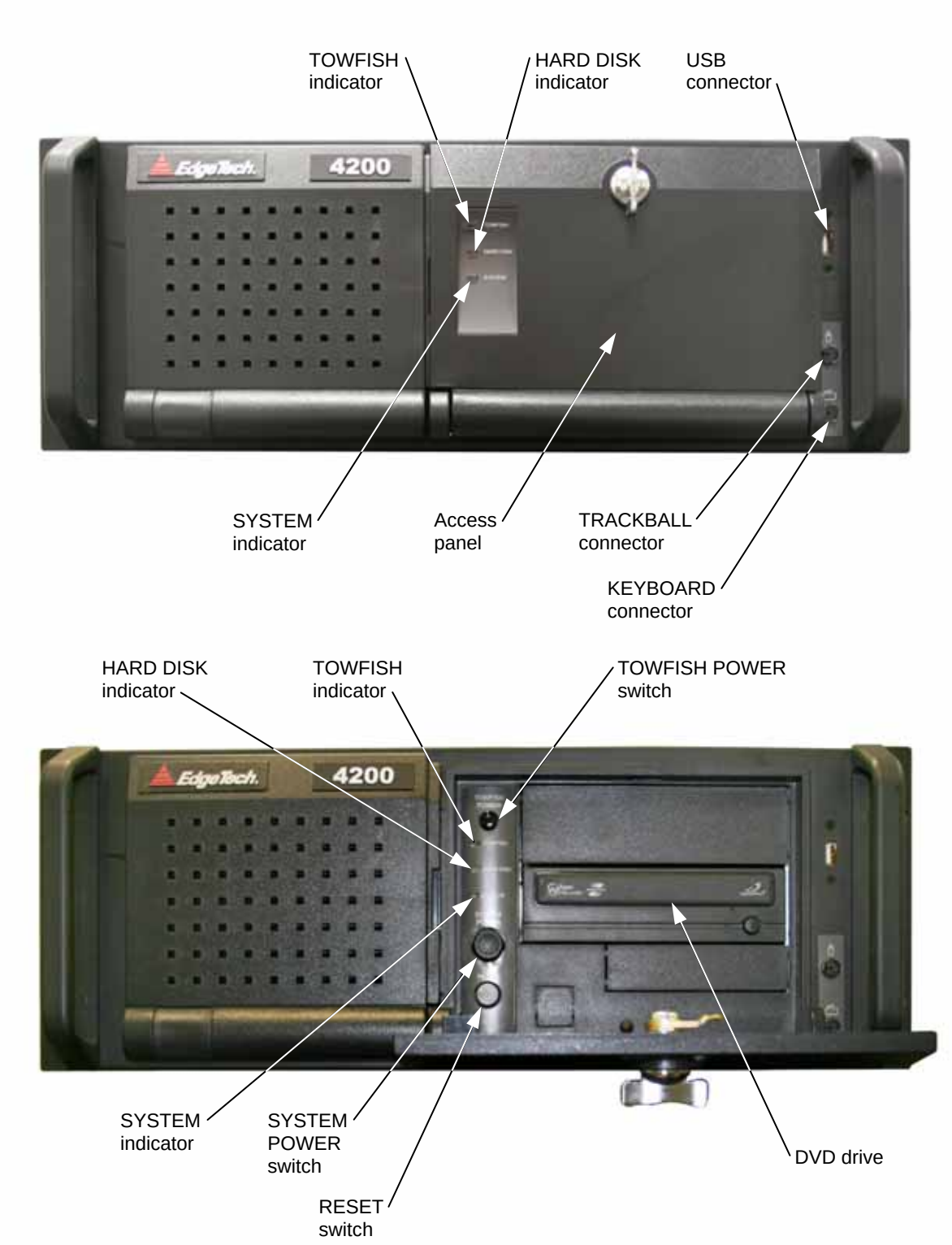


Figure 3-2: 4200 Rack Mount Topside Processor—Front Panel Opened and Closed

TOWFISH POWER: Push button toggle switch. Applies power to the tow vehicle.

RESET: Momentary push button switch. Resets the 4200 Rack Mount Topside Processor.

TOWFISH: Red indicator. Illuminated when power is being applied to the tow vehicle.

HARD DISK: Red indicator. Flashes when a hard drive on the 4200 Rack Mount Topside Processor is being accessed.

SYSTEM: Green indicator. Illuminated when the 4200 Rack Mount Topside Processor is on.

3.5.2 4200-P Portable Topside Processor Controls and Indicators

The 4200-P Portable Topside Processor includes controls and indicators on the side panel as shown in Figure 3-3 on page 3-8.

The 4200-P Portable Topside Processor controls and indicators are the following:

POWER (switch): Toggle switch. Turns on the 4200-P Portable Topside Processor.

POWER (indicator): Red indicator. Illuminated when the 4200-P Portable Topside Processor is on.

FISH POWER: Red indicator. Illuminated when the 4200-P Portable Topside Processor is on *and* the tow vehicle is properly connected to it.

NOTE: **The 4200-P Portable Topside Processor will automatically switch off power to the tow vehicle should the processor be disconnected from the tow vehicle for an extended period. The power will also be turned off if an over current or under current condition exists. To reactivate the power to the tow vehicle, turn the POWER switch off and then on again.**

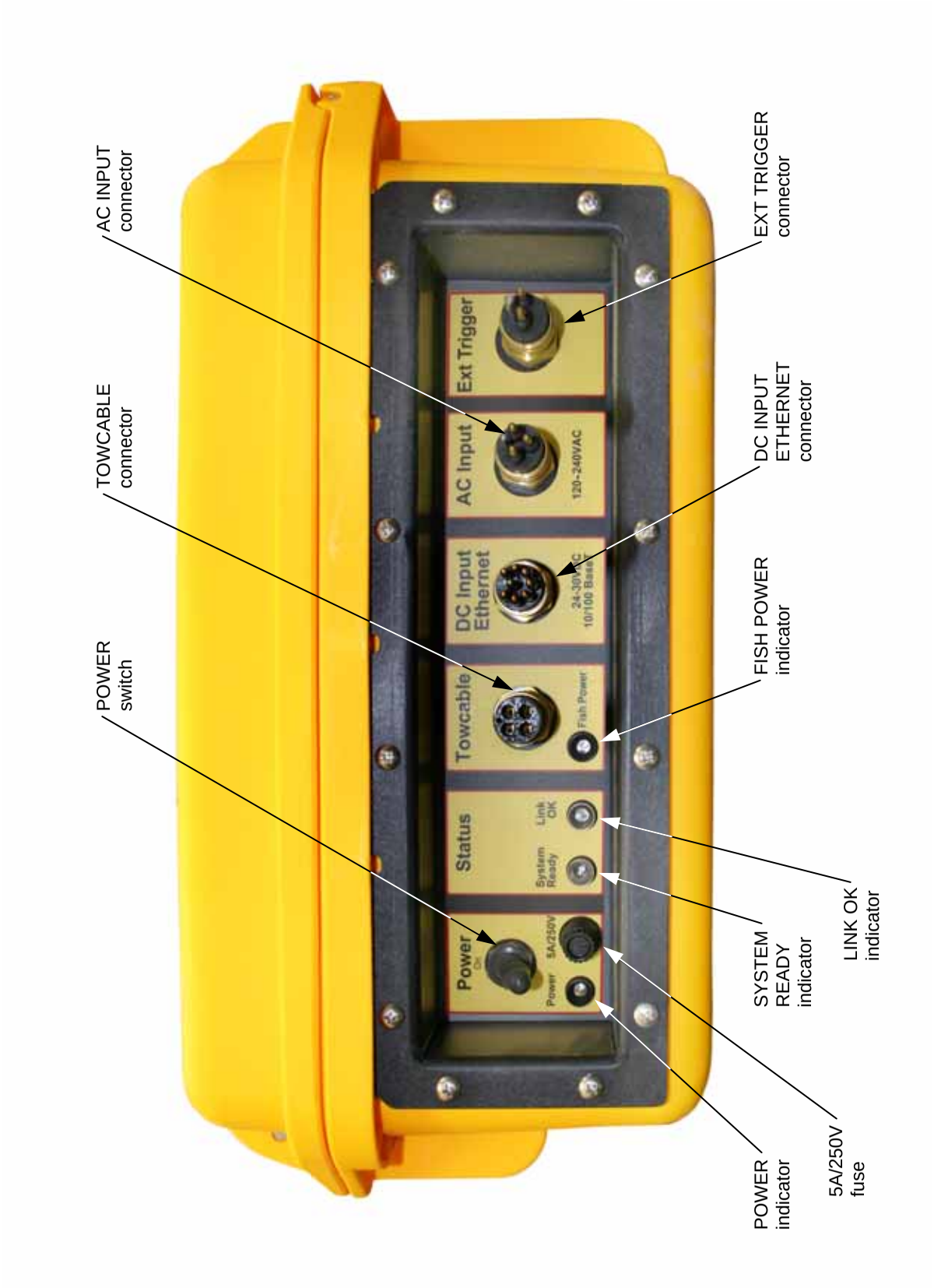


Figure 3-3: 4200-P Portable Topside Processor Side Panel

SYSTEM READY: Green indicator. Flashes when the 4200-P Portable Topside Processor is waiting for an Ethernet connection, wired or wireless, to the DISCOVER software. Illuminates continuously when an active Ethernet connection, wired or wireless, is established with the DISCOVER software; the DISCOVER software is running; and the DISCOVER software network settings are configured correctly.

LINK OK: Yellow indicator. Flashes while the 4200-P Portable Topside Processor is establishing a reliable communications link with the tow vehicle. Illuminates continuously when a reliable communications link with the tow vehicle is established.

3.5.3 701-DL Digital Link Controls and Indicators

The 701-DL Digital Link includes controls and indicators on the front and back panels as shown in Figure 3-4.

The 701-DL Digital Link controls and indicators are the following:

LINE: Rocker switch. Switches AC power to the POWER switch on the front panel of the 701-DL Digital Link. This switch can be left in the on position at all times.

POWER (switch): Rocker switch. Turns on the 701-DL Digital Link.

POWER (indicator): Green indicator. Illuminated when the 701-DL Digital Link is on.

LAN: Green indicator. Flashes continuously when an Ethernet connection is established.

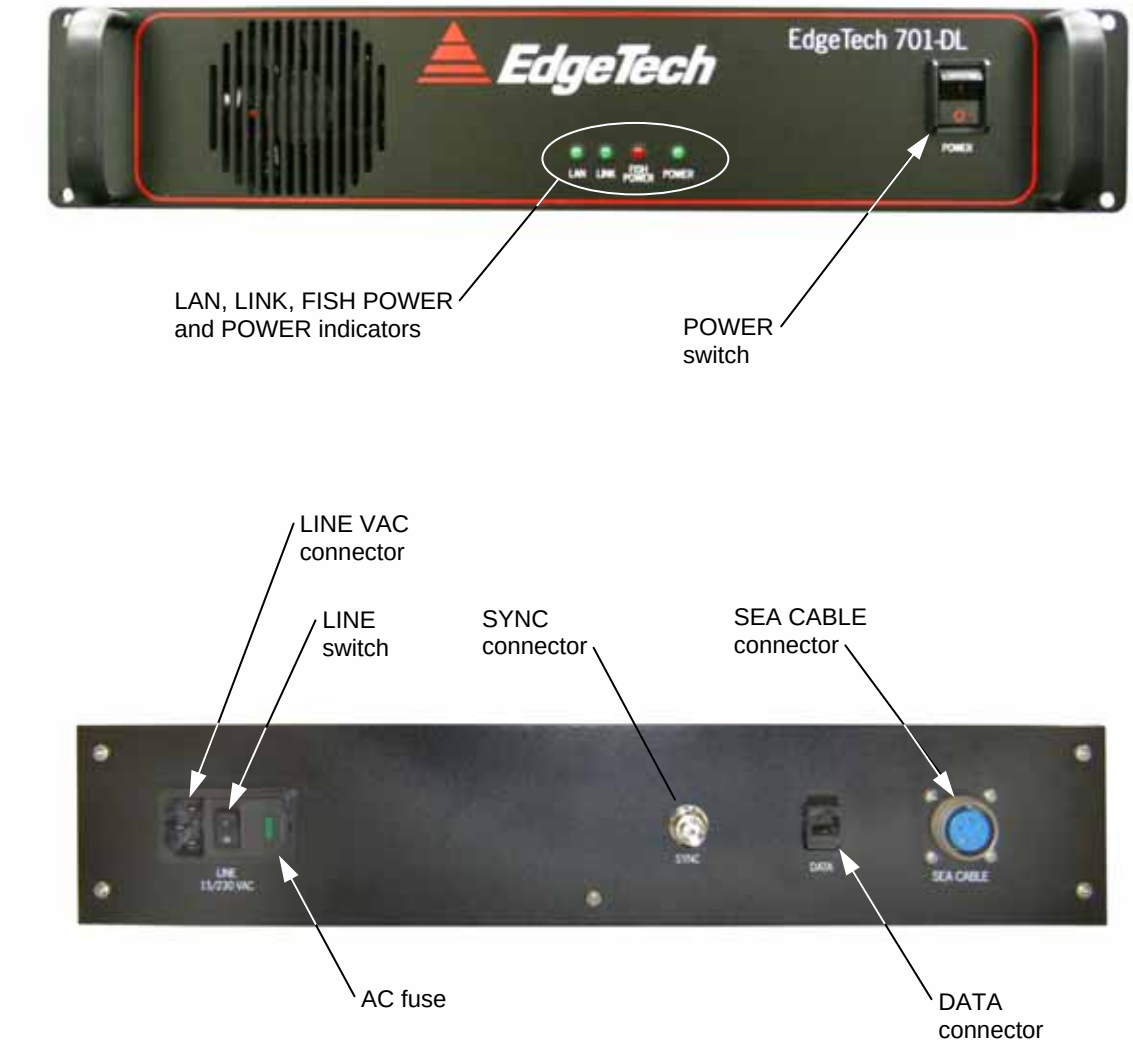


Figure 3-4: 701-DL Digital Link—Front and Back Panels

LINK: Green indicator. Flashes while the 701-DL Digital Link is establishing a reliable communications link with the tow vehicle. Illuminates continuously when a reliable communications link with the tow vehicle is established.

FISH POWER: Red indicator. Illuminated when the 701-DL Digital Link is on and the tow vehicle is properly connected to it.

NOTE: **The 701-DL Digital Link will automatically switch off power to the tow vehicle should the processor be disconnected from the tow vehicle for an extended period. The power will also be turned off if an over current or under current condition exists. To reactivate the power to the tow vehicle, turn the POWER switch off and then on again.**

3.6 Topside Processor Connections

The 4200 Rack Mount Topside Processor connections are made to both the front and back panels. The 701-DL Digital Link connections are made to the back panel only, and connections to the 4200-P Topside Processor are made to a side panel.

3.6.1 4200 Rack Mount Topside Processor Connections

Most of the connections to the 4200 Rack Mount Topside Processor are made using connectors on the back panel of the processor. These connectors are shown in Figure 3-1 on page 3-5. The trackball and keyboard connections are made using connectors on the front panel. These connectors are shown in Figure 3-2 on page 3-6.

The 4200 Rack Mount Topside Processor connections are the following:

TRACKBALL: PS2 connector. Connects to the trackball.

KEYBOARD: PS2 connector. Connects to the keyboard.

SEA CABLE: 5-Pin female bulkhead connector. Connects to the tow cable.

MONITOR: DB-15 female connector. Connects to the LCD monitor.

COM 1-NAV: DB-9 female connector. RS-232 serial port that connects to the navigation system.

COM 3: DB-9 female connector. RS-232 serial port that can be used to connect to the navigation system.

PARALLEL: DB-25 female connector. Connects to an optional printer or outputs tow vehicle depth, heading and altitude.

EXT TRIGGER: BNC connector. Connects to an external trigger source to trigger the sonar. A TTL level trigger input must be used, where the leading or trailing edge, as selected in the DISCOVER software, triggers the sonar.

MARK: BNC connector. When momentarily shorted, produces an event mark on the DISCOVER waterfall display.

USB: (3) USB connectors. Two on the back panel and one on the front.

VAC INPUT: CEE-type AC input connector. Connects to 90–260 VAC, 50/60 Hz power.

3.6.2 4200-P Portable Topside Processor Connections

All of the connections to the 4200 Portable Topside Processor are made using connectors on the side panel of the processor. These connectors are shown in Figure 3-3 on page 3-8.

The 4200-P Portable Topside Processor connections are the following:

TOWCABLE: 4-pin female bulkhead connector. Connects to the tow cable.

DC INPUT ETHERNET: 8-pin female bulkhead connector. Connects to 24 VDC power and provides a 10/100BaseT Ethernet connection to the laptop computer.

AC INPUT: 3-pin male bulkhead connector. Connects to 90–260 VAC, 50/60 Hz power.

EXT TRIGGER: 2-pin male bulkhead connector. Connects to an external trigger source to trigger the sonar. A TTL level trigger input must be used, where the leading or trailing edge, as selected in the DISCOVER software, triggers the sonar.

3.6.3 701-DL Digital Link Connections

All of the connections to the 701-DL Digital Link are made using connectors on the back panel. These connectors are shown in Figure 3-4 on page 3-10.

The 701-DL Digital Link connections are the following:

SEA CABLE: 5-Pin female bulkhead connector. Connects to the tow cable.

SYNC: BNC connector. Connects to an external trigger source to trigger the sonar. A TTL level trigger input must be used, where the leading or trailing edge, as selected in the DISCOVER software, triggers the sonar.

DATA: RJ-45 connector. Provides a 10/100BaseT Ethernet connection to a user supplied computer.

3.7 TCP/IP Address Settings

The 4200 Series high Definition Dual Frequency Side Scan Sonar System includes a number of Ethernet devices connected on a common local area network (LAN), and each of these devices has a factory set TCP/IP address which under normal circumstances does not require changing. However, should any of these devices be replaced, or if upgrades are later installed, it may be required that the TCP/IP addresses be reconfigured. In addition, any computer that is to be connected to the 4200-P Portable Topside Processor or the 701-DL Digital Link must have its IP address set to 192.9.0.nnn, where nnn is any integer from 1 to 100—except for the following reserved addresses:

- 192.9.0.22
- 192.9.0.23
- 192.9.0.225
- 192.9.0.101
- 192.9.0.102

The factory IP address setting of the wired Ethernet connection for the laptop computer included with the 4200-P Portable Topside Processor is 192.9.0.99, and for the wireless Ethernet connection, the factory setting is 192.9.0.100.

For a list of the topside processor Ethernet devices and their TCP/IP addresses, refer to Table 3-2, and for the tow vehicle, to Table 3-3.

Table 3-2: Topside Processor Ethernet Devices TCP/IP Addresses

DEVICE	TCP/IP ADDRESS
Net Burner board	192.9.0.102
ASDL Modem board	192.9.0.22
Wireless bridge	192.9.0.225

Table 3-3: Tow Vehicle Ethernet Devices IP Addresses

DEVICE	TCP/IP ADDRESS
CPU board	192.9.0.101
ASDL Modem board	192.9.9.23

3.8 Connecting the System Components

All of the system components, including optional components, such as a printer, a navigation system and external sonar systems are made to the topside processor. A n example of a fully connected system is shown in the connection diagram in Figure 3-5.

WARNING!

Do not connect the tow cable to the topside processor before connecting it to the tow vehicle, otherwise injury or death can occur if the exposed connector on the tow cable is energized. Always connect the tow cable to the tow vehicle first.

When connecting the system components, refer to “Topside Processor Connections” on page 3-11 for the location and description of the connectors. The topside processor cables used with the system are shown in Figure 3-6.

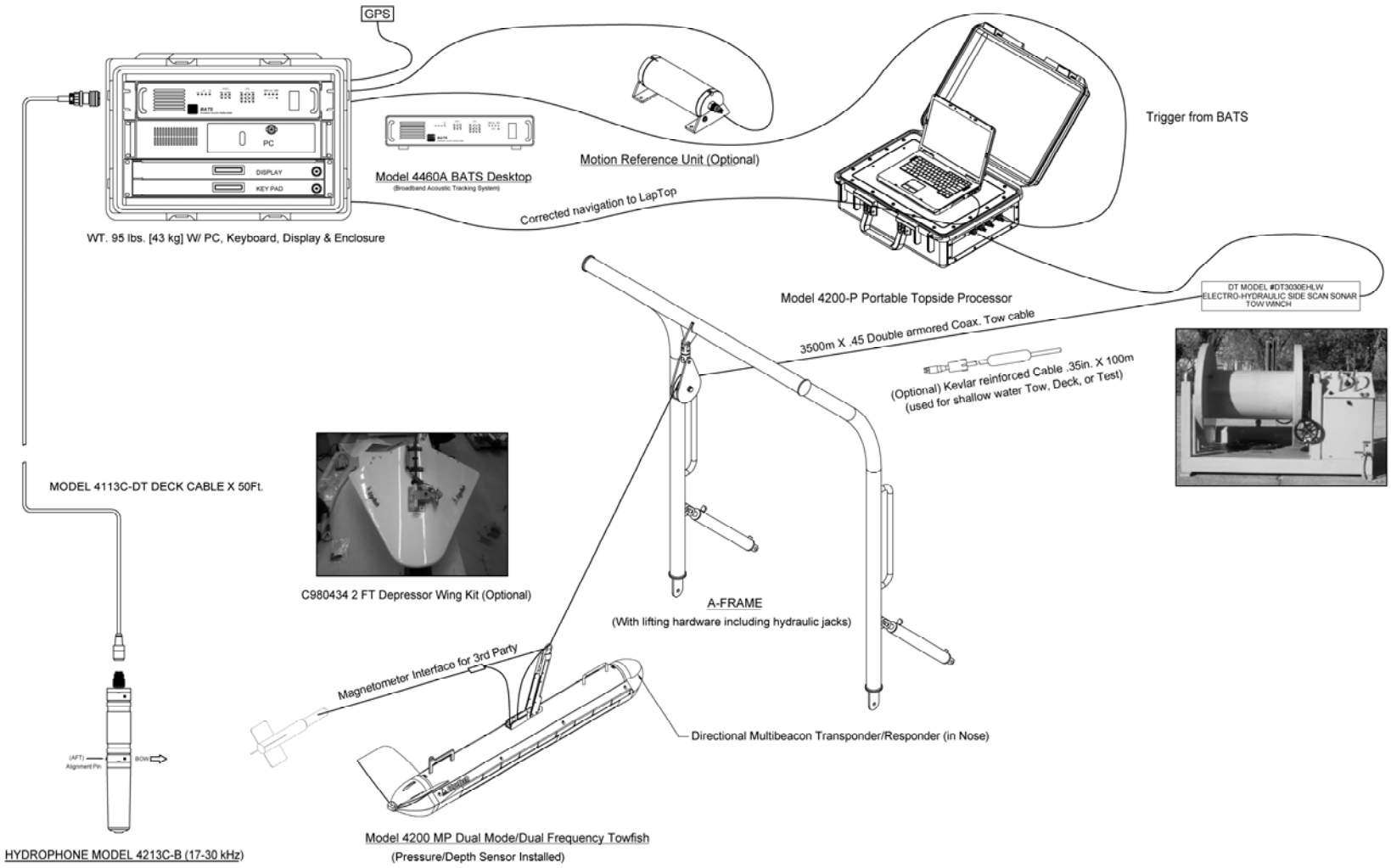

GPS
PC
DISPLAY
KEY PAD
WT. 95 lbs. [43 kg] W/ PC, Keyboard, Display & Enclosure
Model 4460A BATS Desktop
(Broadband Acoustic Tracking System)
Motion Reference Unit (Optional)
Corrected navigation to LapTop
Trigger from BATS
Model 4200-P Portable Topside Processor
DT MODEL #DT3030EHLW
ELECTRO-HYDRAULIC SIDE SCAN SONAR
TOW WINCH
3500m X .45 Double armored Coax. Tow cable
(Optional) Kevlar reinforced Cable .35in. X 100m
(used for shallow water Tow, Deck, or Test)
MODEL 4113C-DT DECK CABLE X 50Ft.
C980434 2 FT Depressor Wing Kit (Optional)
A-FRAME
(With lifting hardware including hydraulic jacks)
Magnetometer Interface for 3rd Party
Directional Multibeacon Transponder/Responder (in Nose)
(AFT)
Alignment Pin
BOW
HYDROPHONE MODEL 4213C-B (17-30 kHz)
Model 4200 MP Dual Mode/Dual Frequency Towfish
(Pressure/Depth Sensor Installed)

Figure 3-5: Example 4200 Series High Definition Dual Frequency Side Scan Sonar System Connection Diagram

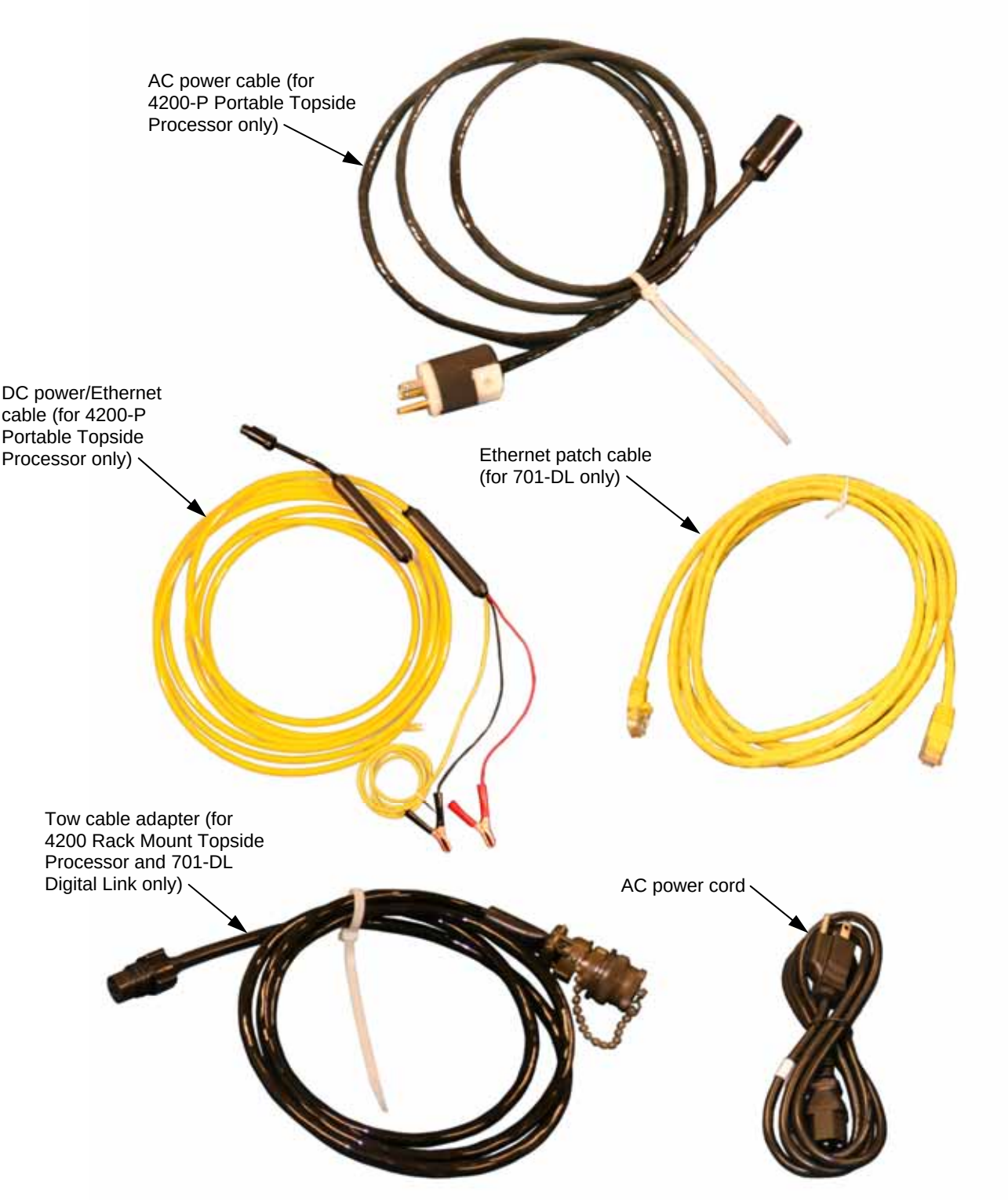

AC power cable (for 4200-P Portable Topside Processor only)
DC power/Ethernet cable (for 4200-P Portable Topside Processor only)
Ethernet patch cable (for 701-DL only)
Tow cable adapter (for 4200 Rack Mount Topside Processor and 701-DL Digital Link only)
AC power cord

Figure 3-6: Topside Processor Cables

3.8.1 Connecting and Attaching the Tow Cable to the Tow Vehicle

A tow cable is shown connected and attached to a tow vehicle in Figure 3-7. This arrangement is similar for all 4200 Series Tow Vehicles and for both Kevlar reinforced and armored tow cables.

To connect and attach the tow cable to the tow vehicle:

1. Verify that the tow cable is not connected to the topside processor.
2. Attach the tail fins to the tow vehicle and secure them in place with the thumb screw.
3. Verify that the tow cable connector on the tow vehicle and the mating female connector on the tow cable are free of corrosion or dirt. If dirty, clean them with an alcohol wipe.
4. Apply a thin film of silicone grease to the pins of the tow cable connector on the tow vehicle.
5. Mate the connectors by pressing them firmly together. Do not wiggle the connectors.
6. Secure the connector locking sleeve.

Figure 3-7: Tow Vehicle with Tow Cable Connected and Attached

7. Attach the loop of the swgrip to the shackle on the towing arm and secure the shackle bolt with seizing wire or a tie wrap.
8. Snake the tow cable under the safety cable and lay the waterproof splice into the cradle in the towing arm. Secure the splice with two tie wraps for which holes in the towing arm are provided.
9. Verify that the dummy plug is installed on the option connector if not used.

3.8.2 Installing a Depressor Wing and Connecting and Attaching the Tow Cable to the Tow Vehicle

An armored to cable is shown connected and attached to a tow vehicle with an installed depressor wing in Figure 3-8. This arrangement is similar for all 4200 Series Tow Vehicles.

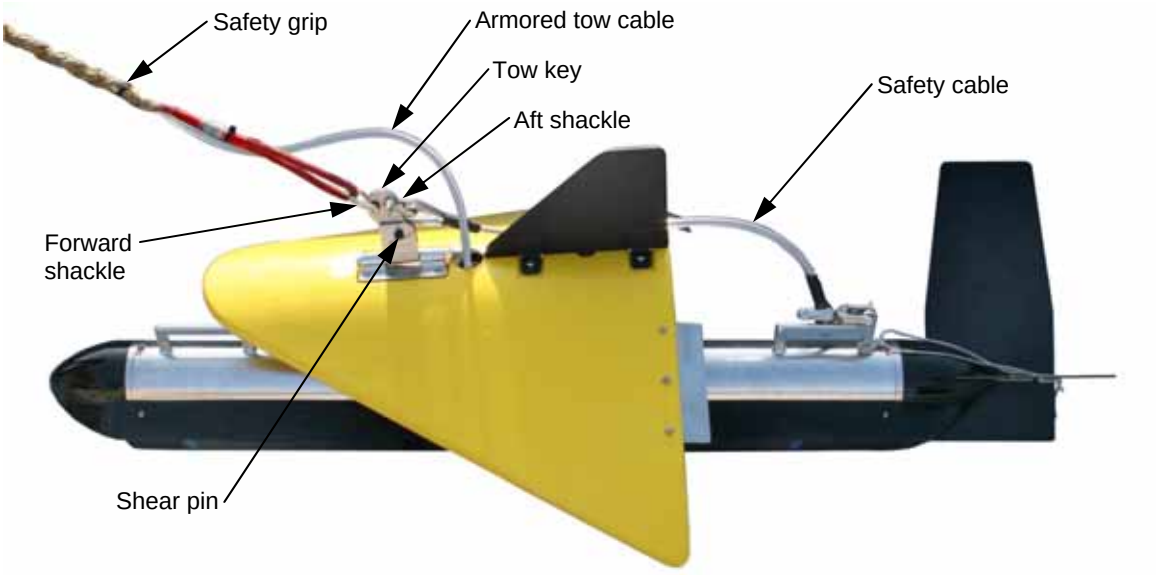


Figure 3-8: Tow Vehicle with Depressor Wing Installed and Tow Cable Connected and Attached with appropriate safety grip.

CAUTION!

Only an armored tow cable should be used for a 4200 Series Tow Vehicle with a depressor wing, otherwise loss of the tow vehicle could occur.

To install the depressor wing and connect and attach the tow cable to the tow vehicle:

1. Verify that the tow cable is not connected to the topside processor.
2. Attach the tail fins to the tow vehicle and secure them with the thumb screw.
3. Detach the safety cable from the tow vehicle rear handle.
4. Verify that the dummy plug is installed on the option connector if not used.
5. Remove the two towing arm bolts shown in Figure 3-9 and remove the towing arm.
6. Install the depressor wing into the slot where the towing arm was mounted and secure it with the two towing arm bolts.
7. Secure depressor safety cable to the rear handle of the tow vehicle.

8. For a wing angle of 0°, leave the configuration as shown in Figure 3-9 with the angle adjustment bolt at the 0° position. For a wing angle of 5°, loosen the pivot bolt and remove the angle adjustment bolt and install this bolt into the second available hole as shown. For a wing angle of 10°, install the bolt into the third available hole as shown. In most cases a setting of 0° works best.
9. Tighten both bolts.
10. Verify that the tow cable connector on the tow vehicle and the mating female connector on the tow cable are free of corrosion or dirt. If dirty, clean them with an alcohol wipe.
11. Apply a thin film of silicone grease to the pins of the tow cable connector on the tow vehicle.

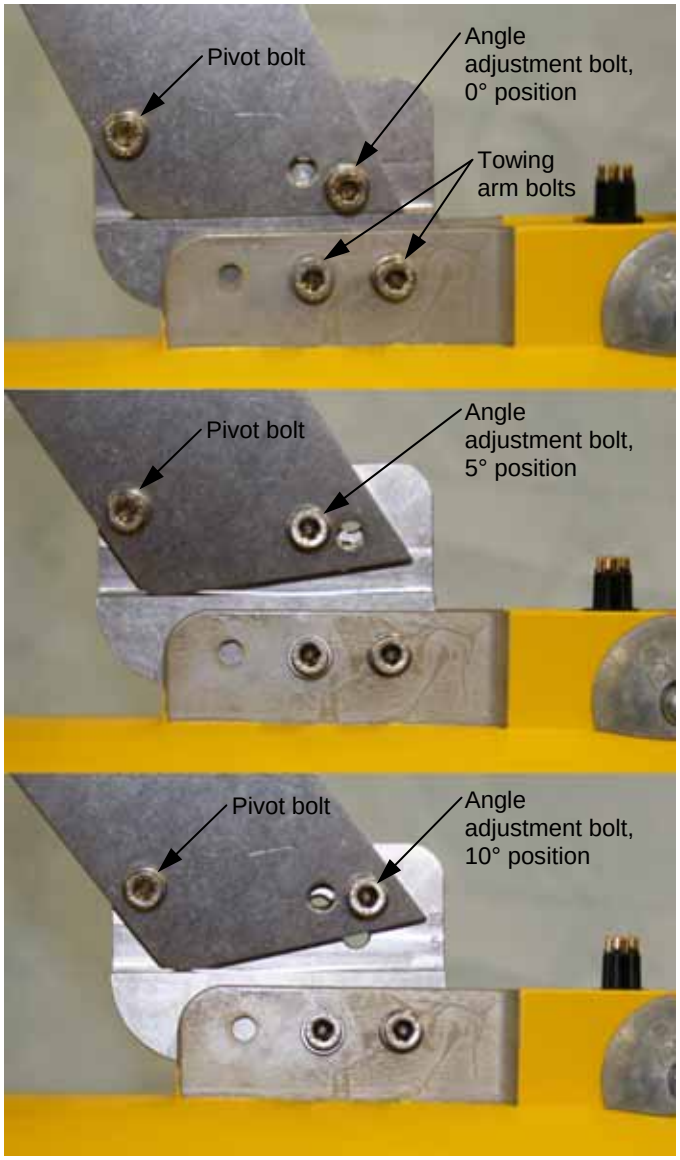


Figure 3-9: Depressor Wing Angle Adjustments

12. Pass the tow cable through the hole on the top of the depressor wing from the top as shown in Figure 3-8 on page 3-18 and mate the connectors by pressing them firmly together. Do not wiggle the connectors.
13. Secure the connector locking sleeve.
14. Pass the safety cable under the tow cable and attach it to the aft shackle on the tow key. Secure the shackle bolt with seizing wire or a tie wrap.
15. Attach the loop of the safety grip to the forward shackle on the tow key and secure the shackle bolt with seizing wire or a tie wrap.

3.8.3 Connecting the 4200 Rack Mount Topside Processor

To connect the 4200 Rack Mount Topside Processor:

1. Verify that the 4200 Rack Mount Topside Processor is *not* connected to AC power.
2. Verify that the tow cable is properly connected and attached to the tow vehicle, and then connect the tow cable adapter to the tow cable and to the SEA CABLE connector.
3. Connect the LCD monitor to the MONITOR connector.
4. Connect the trackball to the TRACKBALL connector.
5. Connect the keyboard to the KEYBOARD connector.
6. If a printer will used, connect the printer to the PARALLEL connector. For information on the printers that can be connected to the 4200 Rack Mount Topside Processor, refer to APPENDIX A: "Printer Connections."
7. If a navigation system will used, connect the navigation system output to the COM 1-NAV connector.
8. If an external source will used to trigger the 4200 Rack Mount Topside Processor, connect the trigger output of this source to the EXT TRIG connector.
9. If the event marker will used, connect the shorting source to the MARK connector.
10. Connect an AC power cord to the VAC INPUT connector and to the AC power source.
11. Connect an AC power cord to the LCD monitor and to the AC power source.

3.8.4 Connecting the 4200-P Portable Topside Processor

To connect the 4200-P Portable Topside Processor:

1. Verify that the 4200-P Portable Topside Processor is *not* connected to AC power.
2. Verify that the tow cable is properly connected and attached to the tow vehicle, and then connect the tow cable to the TOW CABLE connector.
3. If the wired Ethernet connection will be used, connect the RJ-45 connector of the DC power/Ethernet cable to the Ethernet connector of the laptop computer. The Ethernet cable may be extended up to 100 feet using a Category 5 Ethernet crossover or straight patch cable.

   Do not make this connection if the wireless Ethernet connection will be used, as only one Ethernet connection can be connected or enabled at the same time.

4. If the wired Ethernet connection will used or if a DC power source will be used, or both, connect the 8-pin plug of the DC power/Ethernet cable to the DC INPUT ETHERNET connector of the 4200-P Portable Topside Processor.
5. If a printer will used, connect the printer to a USB connector of the laptop computer.

NOTE: Because most laptop computers do not have parallel ports, printing from a laptop computer requires a USB to ETHERNET adapter. At this time the only ETHERNET printers supported are the EPC Models 1086 and HSP100 ETHERNET.

6. If a navigation system will used, connect the navigation system output to COM 1 of the laptop computer.
7. If an external source will used to trigger the 4200-P Portable Topside Processor, connect the trigger output of this source to the EXT TRIGGER connector.
8. Do one of the following to connect power:
   - Connect the AC power cable to the AC INPUT connector and to the AC power source.
   - Connect the red clamp of the DC power/Ethernet cable to the positive terminal of the DC power source, and connect the black clamp to the negative terminal.
   - Connect both the AC and DC power sources as described above.
9. Connect the laptop computer power supply to the computer and to the AC power source.

3.8.5 Connecting the 701-DL Digital Link

To connect the 701-DL Digital Link:

1. Verify that the 701-DL Digital Link is not connected to AC power.
2. Verify that the tow cable is properly connected and attached to the tow vehicle, and then connect the tow cable adapter to the tow cable and to the SEA CABLE connector.
3. Connect the Ethernet patch cable to the DATA connector of the 701-DL Digital Link and to the Ethernet connector of the user supplied computer. This cable may be extended up to 100 feet using a Category 5 Ethernet crossover or straight patch cable.
4. Set the IP address of your computer to 192.9.0.nnn, where nnn is any integer from 1 to 100, except for 192.9.0.22, 192.9.0.23, 192.9.0.225, 192.9.0.101, and 192.9.0.102 which are reserved.

5. If a printer will used, connect the printer to an available printer port.
6. If a navigation system will used, connect the navigation system output to an available serial communications port.
7. If an external source will used to trigger the 701-DL Digital Link, connect the trigger output of this source to the SYNC connector.
8. Connect the AC power cord to the LINE VAC connector and to the AC power source.

3.8.6 Selecting Negative Edge Triggering for the Optional Responder

If an optional responder is installed on the tow vehicle, and it will be used, a jumper is factory installed on the Power board of the topside processor. This jumper selects negative edge triggering for the responder. The location where this jumper is installed is J23 as shown in Figure 3-10. To locate the Power board, refer to SECTION 4: "Technical Description."

Figure 3-10: Location of Jumper J23 on Power Board in Topside Processors

3.9 System Activation and Test

After the connections to the topside processor have been completed, the 4200 Series High Definition Dual Frequency Side Scan Sonar System can be activated and some pre-deployment checks performed prior to deployment of the tow vehicle as a test to verify that the system is operating properly.

When performing the system activation and test, refer to "Topside Processor Connections" on page 3-4 for the location and description of the controls and indicators on the topside processor. In addition, should the system not activate properly or the pre-deployment checks fail, refer to SECTION 5: "Maintenance and Troubleshooting" for assistance on how to isolate and correct the problem.

> ***NOTE:*** **The DISCOVER software requires license activation which is performed either directly in the tow vehicle or by inserting a dongle into an available USB port on the computer running the software. If in the tow vehicle, no action is required.**

To activate the 4200 Rack Mount System:

1. Turn on the POWER switch on the back panel of the 4200 Rack Mount Topside Processor. This switch can be left in the on position at all times if desired.
2. Turn on the LCD monitor.
3. Pull down the access panel and turn on the SYSTEM POWER switch.
4. Turn on the TOWFISH POWER switch.

   The TOWFISH indicator should illuminate. The SYSTEM indicator should illuminate and remain on, and the HARD DISK indicator should flash for two to three minutes while a self test is run. After this test is completed, the DISCOVER software will start and open to the Main window.

   In addition, the NET indicator on the Status bar at the bottom of the Main window should indicate as follows:

   NET: ON

3.9.1 Activating the 4200-P Portable System

To activate the 4200-P Portable System:

1. Turn on the laptop computer and start the DISCOVER software.
2. If the wired Ethernet connection is being used, verify that the wireless network switch is disabled and the Ethernet LAN is enabled. If the wireless Ethernet connection is being used, verify that the wireless network switch is on and Wireless Networking is enabled.
3. Turn on the POWER switch on side panel of the 4200-P Portable Topside Processor.

   The POWER and FISH POWER indicators should illuminate; the SYSTEM READY indicator should flash while it searches for an Ethernet connection to the DISCOVER software and then illuminate continuously when the connection is found; and the LINK OK indicator should flash while a reliable communications link with the tow vehicle is being established and then illuminate continuously when the link is found. In addition, the NET indicator on the Status bar at the bottom of the Main window should indicate as follows:

   NET: ON

3.9.2 Activating the 701-DL Digital Link System

To activate the 701-DL Digital Link System:

1. Turn on the computer and start the DISCOVER or third-party data acquisition and display software.
2. Turn on the LINE switch on the back panel of the 701-DL Digital Link. This switch can be left in the on position at all times if desired.
3. Turn on the POWER switch on the front panel.

   The FISH POWER indicator should illuminate; the LAN indicator should flash continuously; and the LINK indicator should flash while a reliable communications link with the tow vehicle is being established and then illuminate continuously when the link is found. In addition, the NET indicator on the Status bar at the bottom of the Main window should indicate as follows:

   NET: ON

3.9.3 Performing the Pre-deployment Checks

The pre-deployment checks should be performed after the system is activated and before the tow vehicle is deployed. These checks involve verifying that data can be recorded and played back in DISCOVER; rubbing your hand on the transducer arrays while observing the Sonar display in the DISCOVER Main window; verifying correct heading, pitch and roll outputs; and zeroing the pressure sensor.

1. Activate the system as described above.

CAUTION!

Do not allow the transducer arrays on the tow vehicle to continuously transmit in air for an extended period as damage to the transducer arrays could occur.

2. On the DISCOVER Main window, click the Towfish Control tab on the Lower Control panel. This tab is shown in Figure 3-11 for DISCOVER 4200-SP and in Figure 3-12 for DISCOVER 4200-MP.

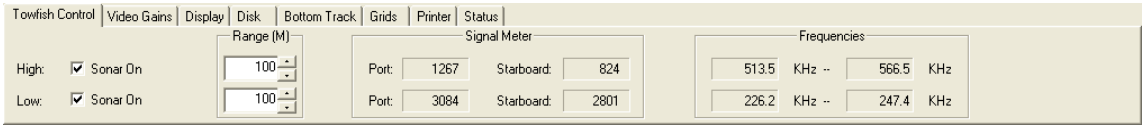


Figure 3-11: Towfish Control Tab—DISCOVER 4200-SP

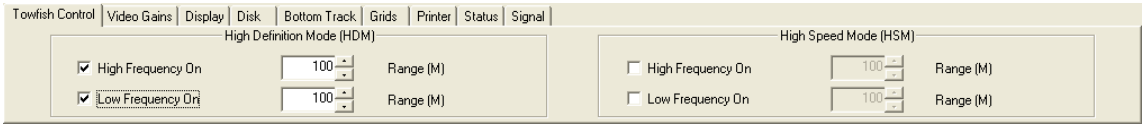


Figure 3-12: Towfish Control Tab—DISCOVER 4200-MP

3. Select the High Sonar On and Low Sonar On check boxes for DISCOVER 4200-SP, or the High Frequency On and Low Frequency On check boxes for DISCOVER 4200-MP.

   The transducer arrays on the tow vehicle should begin transmitting and data should begin scrolling on the Sonar display in the DISCOVER Main window.

4. Record a few minutes of data and then play back the data and verify that data can be recorded and played back.

5. Rub the port and starboard transducer arrays while observing the Sonar display in the DISCOVER Main window.

   You should observe streaks or noise spikes in the waterfall display.

6. Verify that the heading, pitch and roll sensors are working correctly by rotating, tilting and rolling the tow vehicle and observing the Heading, Pitch and Roll displays in the Lower Indicator bar in the DISCOVER Main window.

7. If a pressure sensor is installed, verify that the Pressure display indication is at or nearly zero. The Pressure sensor can be zeroed on deck in the DISCOVER software under External Device Controls.

3.10 Tow Vehicle Deployment

The 4200-SP and 4200-SP Tow Vehicles can be towed at speeds of up to 4.8 knots while still meeting NOAA and IHO-44S specifications of 3 pings on a 1-meter cubed target at 100 meters. The 4200-MP and 4200-MP Lightweight Tow Vehicles can be towed at speeds of up to 9.6 knots with the same results when operating in HSM. Shown in Figure 3-13 is a 4200-MP Tow Vehicle being deployed.

CAUTION!

When lowering the tow vehicle in an area where the bottom topography is not known, be careful not to strike the bottom or a submerged object, otherwise damage to the tow vehicle may occur. In addition, at all times during the survey, be sure to carefully monitor tow vehicle altitude, as failure to do so may result in the tow vehicle hitting the bottom or becoming snagged.

CAUTION!

Do not tow the tow vehicle too close to the survey vessel. Towing in this manner can cause the tow vehicle to be pulled in against the hull of the ship due to the low pressure of the propeller wash and the effect of the water flowing by the hull. In addition, sonar reflections from the hull may be evident in the records.

CAUTION!

Do not tow the tow vehicle with the nose angled up or down. Doing so can degrade the sonar imagery. Verify that the tow vehicle is as level as possible when towing it.

Figure 3-13: 4200-MP Tow Vehicle being Deployed

NOTE: **For detailed towing characteristics for a number of tow cable types and lengths and tow vehicle speeds, with or without a depressor, refer to "Towing Characteristics for EdgeTech's 4200 Series Towfish," Revision 8.**

NOTE: **For detailed information about the EdgeTech DISCOVER software, including how to record data, refer to the "DISCOVER 4200-SP Side Scan Processor Software User's Manual" or to the "4200-MP Side Scan Processor Software User's Manual," depending on the tow vehicle being used.**

To deploy the tow vehicle:

1. With the survey vessel under way at up to two knots, slowly and carefully lower the tow vehicle into the water, well away from the propeller. Do not let the tow vehicle strike the hull of the survey vessel.
2. Lower the tow vehicle to a depth of about three meters, or just below the propeller wash.

3. Click the Towfish Control tab and select the range for each frequency. This tab is shown in Figure 3-11 on page 3-25 for DISCOVER 4200-SP and in Figure 3-12 on page 3-25 for DISCOVER 4200-MP.
4. Click the Bottom Track tab on the Lower Control panel. This tab is shown in Figure 3-14.

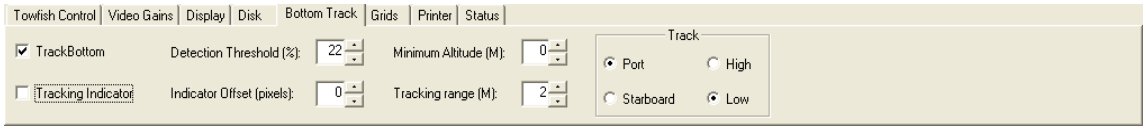


Figure 3-14: Bottom Track Tab

5. On the Bottom Track tab make the required settings to track the bottom and note the tow vehicle altitude in the Altitude display.
6. Lower the tow vehicle such that its altitude is 10–15% of the range selection.
7. Increase the survey vessel speed to the desired survey speed and adjust the amount of cable out such that the altitude of the tow vehicle remains at 10–15% of the range selection.
8. If a pressure sensor is installed, verify that the Pressure display indication is correct.
9. Secure the tow cable to the survey vessel.
10. Begin recording data.

3.11 Tow Vehicle Recovery

To recover the tow vehicle:

1. Click the Towfish Control tab and clear the High Sonar On and Low Sonar On check boxes for DISCOVER 4200-SP, or the High Frequency On and Low Frequency On check boxes for DISCOVER 4200-MP. This tab is shown in Figure 3-11 on page 3-25 for DISCOVER 4200-SP and in Figure 3-12 on page 3-25 for DISCOVER 4200-MP.
2. Slowly pull in the tow cable until the tow vehicle is just below the surface.
3. Slow the survey vessel speed to under two knots. However, if practical, the survey vessel should be put in neutral while the tow vehicle is brought on board.
4. Retrieve the tow vehicle from the water and carefully lower it on deck.

5. Do one of the following to turn off the power to the tow vehicle.
   - For the 4200 Rack Mount Topside Processor, turn off the TOWFISH POWER switch.
   - For the 4200-P Portable Topside Processor or the 701-DL Digital Link, turn off the POWER switch.
6. Disconnect the tow cable from the tow cable connector.
7. Install the dummy plug on the tow cable connector.
8. Refer to “Periodic Maintenance” on page 5-1 for instructions on how to clean and inspect the tow vehicle, the tow cable and the underwater connectors after use.

SECTION 4: Technical Description

This section provides an overall general description of the hardware elements comprising each of the available topside processors and tow vehicles of the 4200 Series High Definition Dual Frequency Side Scan Sonar System. This information, which includes block diagrams, board descriptions, chassis photos, component callouts, and wiring diagrams, can be useful for troubleshooting purposes and installing optional equipment.

4.1 Topside Processors

There are three available topside processors: the 4200 Rack Mount Topside Processor, the 4200-P Portable Topside Processor and the 701-DL Digital Link..

4.1.1 4200 Rack Mount Topside Processor

A block diagram of the 4200 Rack Mount Topside Processor electronics is shown in Figure 4-1. The electronics chassis is shown in Figure 4-2 on page 4-3. The main hardware elements in the 4200 Rack Mount Topside Processor include the following components and circuit boards:

Power. The Power board inputs +24 VDC on J1 from the 24 VDC Power Supply and generates the 400 VDC tow vehicle power which is output to the tow vehicle on J13 combined with the frequency shift keyed (FSK) responder trigger signal input on J10 and the ADSL downlink command and uplink data signals. The command signals are input and the data signals are output on J14. The Power board also includes +5, +12 and +15 VDC power supplies, where +12 VDC is output on J4 to the fan and on J6 to the ADSL Modem board.

24 VDC Power Supply. The 24 VDC Power Supply inputs switched AC power from the Computer Power Supply to generate +24 VDC which is output to the Power board.

Computer Power Supply. Switches AC power to the 24 VDC Power Supply and provides DC power for the CPU Board and the hard drives.

ADSL Modem. The ADSL Modem board converts the uplink data ADSL signals received from the tow vehicle and input on the ADSL connector from the Power board into Ethernet 10/100BaseT signals which are output through a direct connection to the Ethernet port of the CPU board. Similarly, the ADSL Modem board converts the downlink Ethernet 10/100BaseT based command signals from the CPU board into the ADSL downlink command signals which are output on the ADSL connector to the

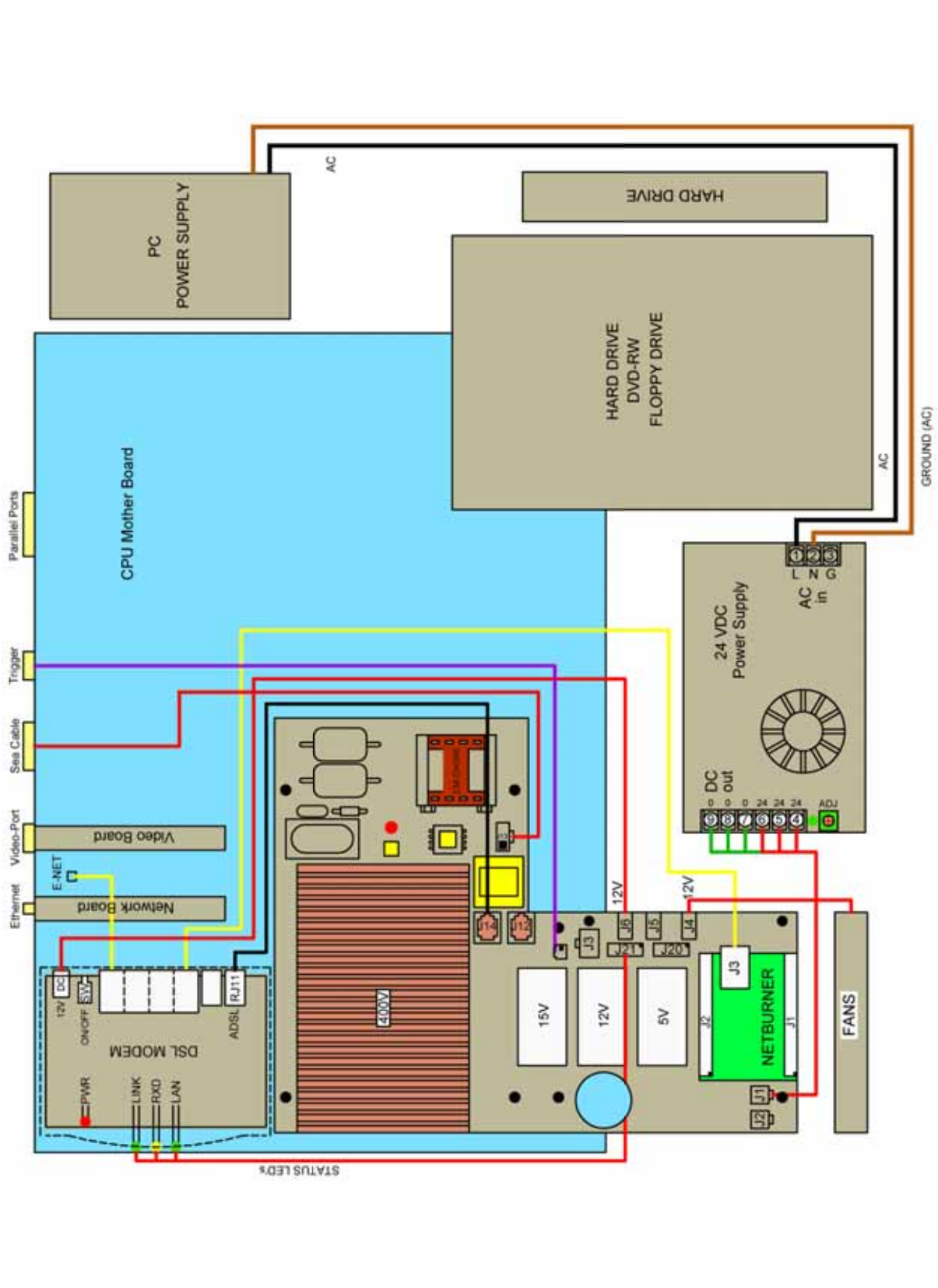


Figure 4-1: 4200 Rack Mount Topside Processor Electronics Detailed Block Diagram

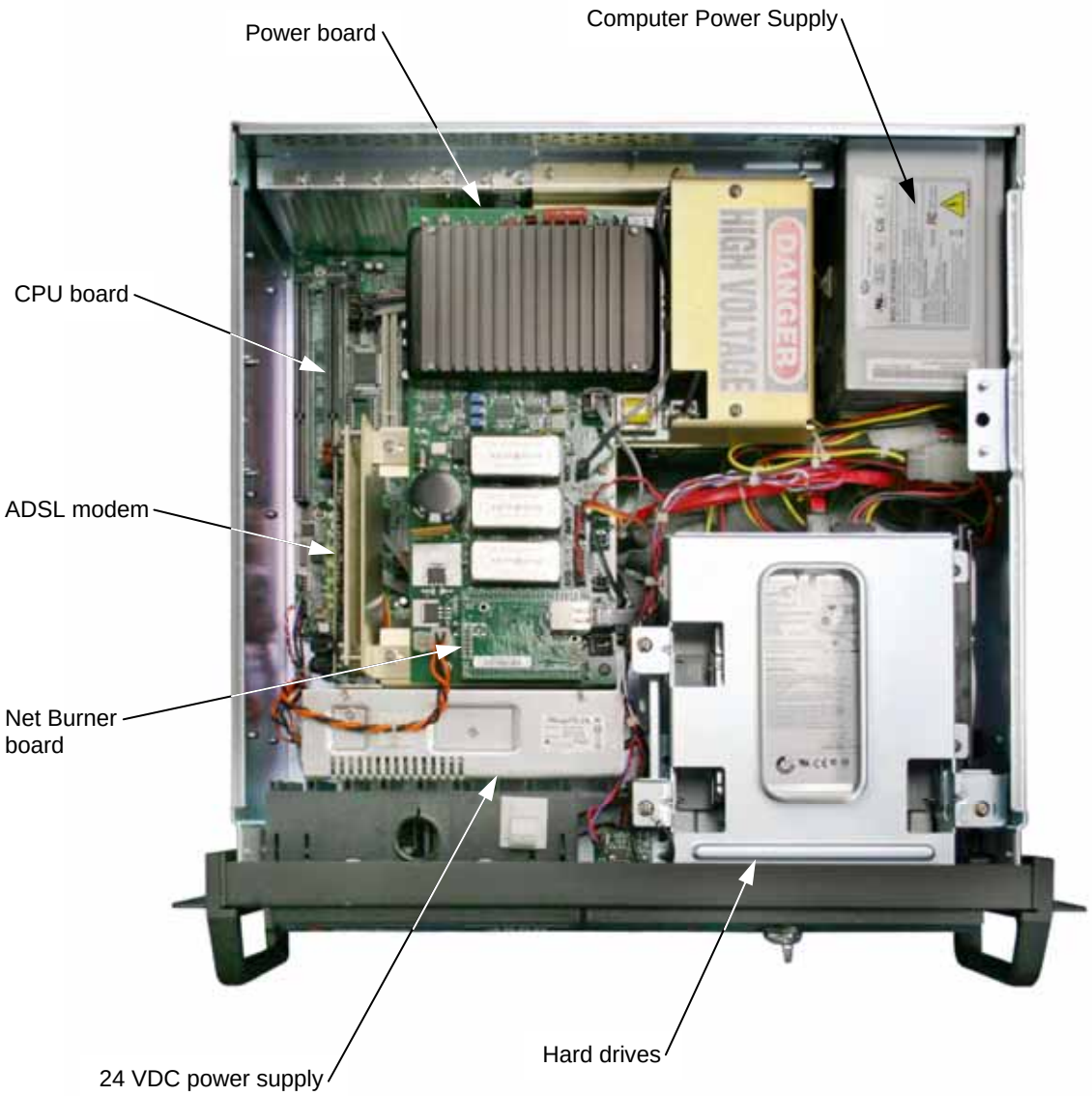


Figure 4-2: 4200 Rack Mount Topside Processor Chassis

Power board for transmission to the tow vehicle. The ADSL Modem board also serves as an Ethernet switch to provide an Ethernet connection on J1 to the Net Burner board on the Power board, placing the Net Burner board on the same local area network (LAN). +12 VDC power is input on the DC connector from the Power board.

Net Burner. The Net Burner board mounts to and connects directly to the Power board to provide Power board diagnostics, tow vehicle power control, positive and negative trigger edge selection, and sensor monitoring. An Ethernet connection to the Net Burner board is provided on J3 from the ADSL Modem board. Power is input from the Power board.

CPU. The CPU board runs the Microsoft Windows XP operating system and the DISCOVER software on an Intel Pentium 4, 2.4 GHz processor and includes 512 MB of RAM. The CPU board outputs downlink commands to the tow vehicle over the Ethernet connection to the ADSL modem board while it inputs the uplink sonar data from the tow vehicle over the same connection. A 160-MB hard drive contains the operating software, and a 1-TB hard drive is used for data storage. Both hard drives interface with the CPU board as do the monitor, the keyboard and the trackball. Power for the CPU board is provided by the Computer Power Supply.

Hard drives. A 160-MB hard drive (C:\ drive) stores the Windows XP operating system and the application software. A 1-TB hard drive (D:\ drive) is used for data storage.

4.1.2 4200-P Portable Rack Mount Topside Processor

A block diagram of the 4200-P Portable Topside Processor electronics is shown in Figure 4-3. The wiring diagram is shown in Figure 4-5 on page 4-7, and the electronics chassis is shown in Figure 4-6 on page 4-8. The main hardware elements in the 4200-P Portable Topside Processor include the following components and circuit boards:

Power. The Power board inputs +24 VDC on J1 from the 24 VDC Power Supply on J2 from the external 24 VDC input and generates the 400 VDC tow vehicle power which is output to the tow vehicle on J13 combined with the frequency shift keyed (FSK) responder trigger signal input on J10 and the ADSL downlink command and uplink data signals. The command signals are input and the data signals are output on J14. The Power board also includes +5, +12 and +15 VDC power supplies, where +12 VDC is output on J4 to the fan and on J6 to the ADSL Modem board.

24 VDC Power Supply. The 24 VDC Power Supply inputs AC power from the AC Line Filter to generate +24 VDC which is output to the Power board.

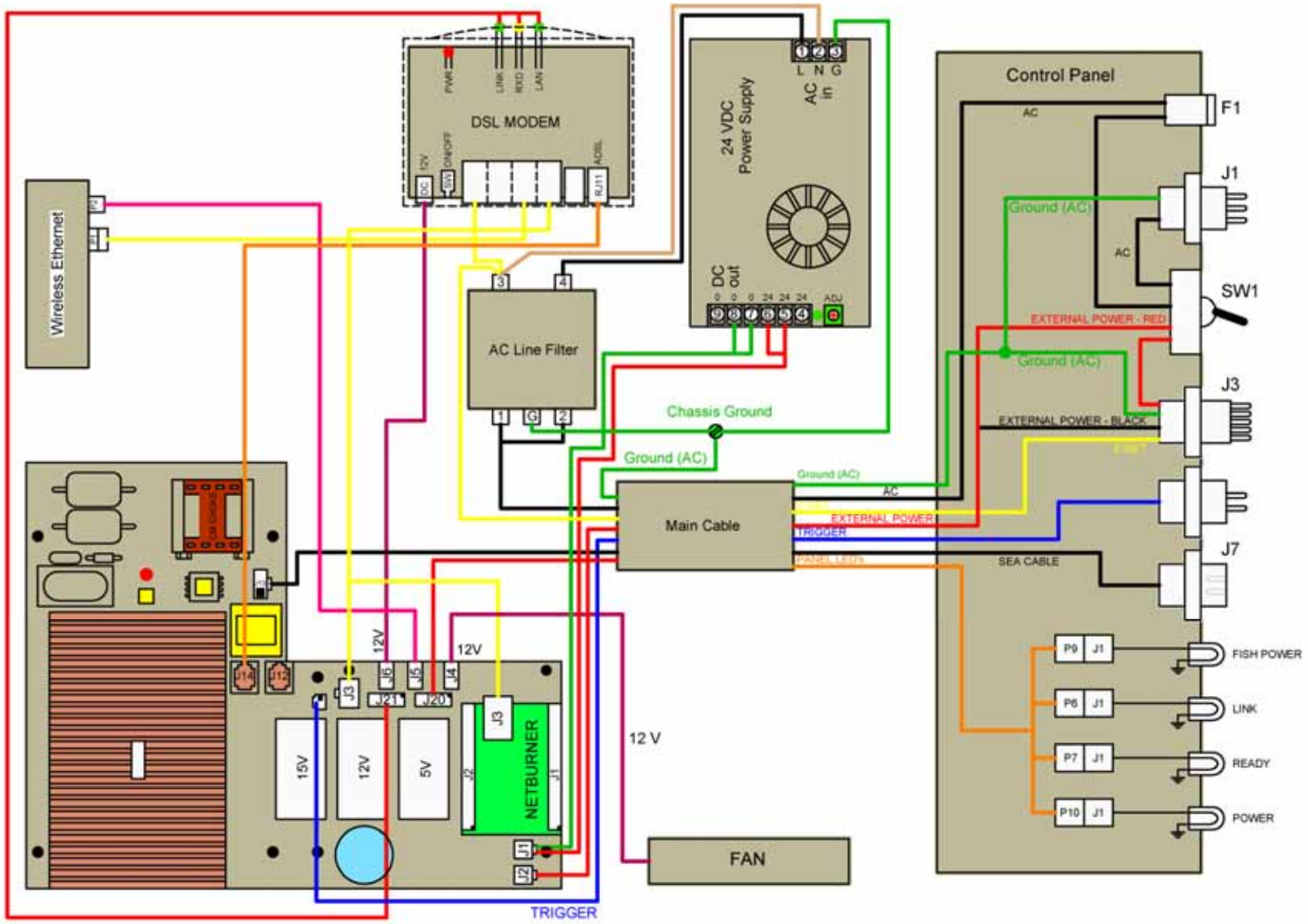


Figure 4-3: 4200-P Portable Topside Processor Electronics Detailed Block Diagram

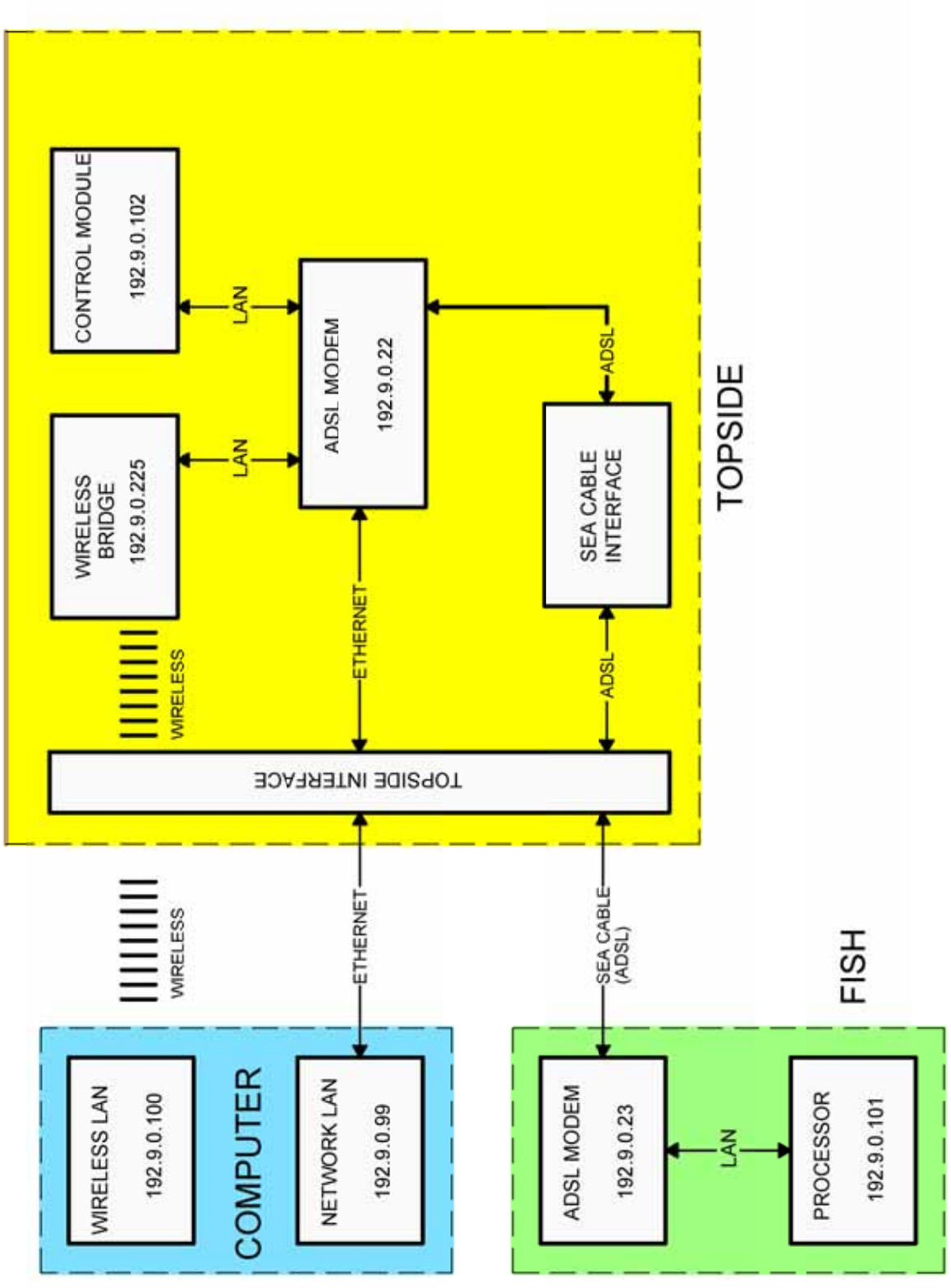


Figure 4-4 4200-P Topside Processor Electronics Overall Block Diagram

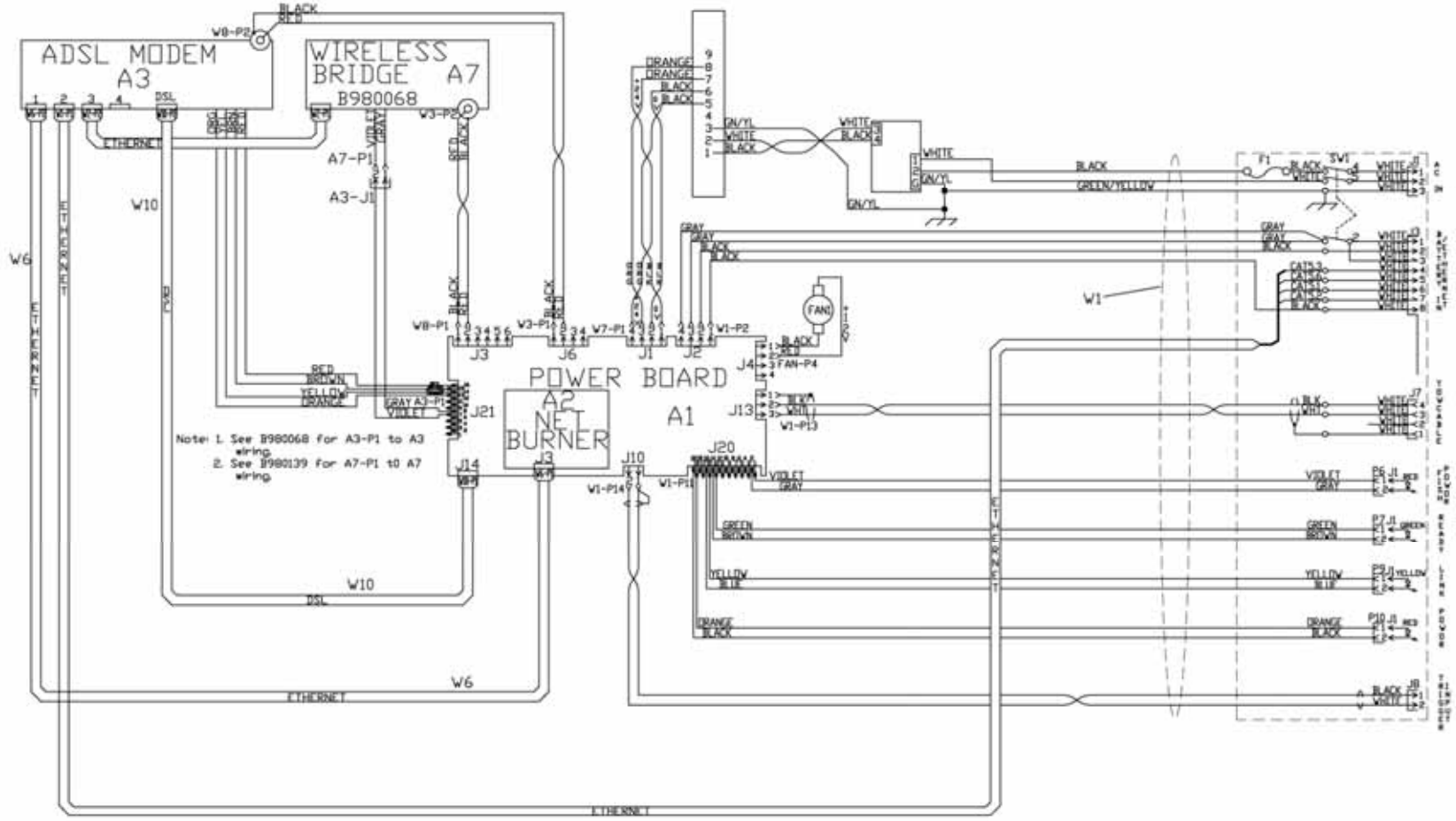


Figure 4-5: 4200-P Portable Topside Processor Wiring Diagram

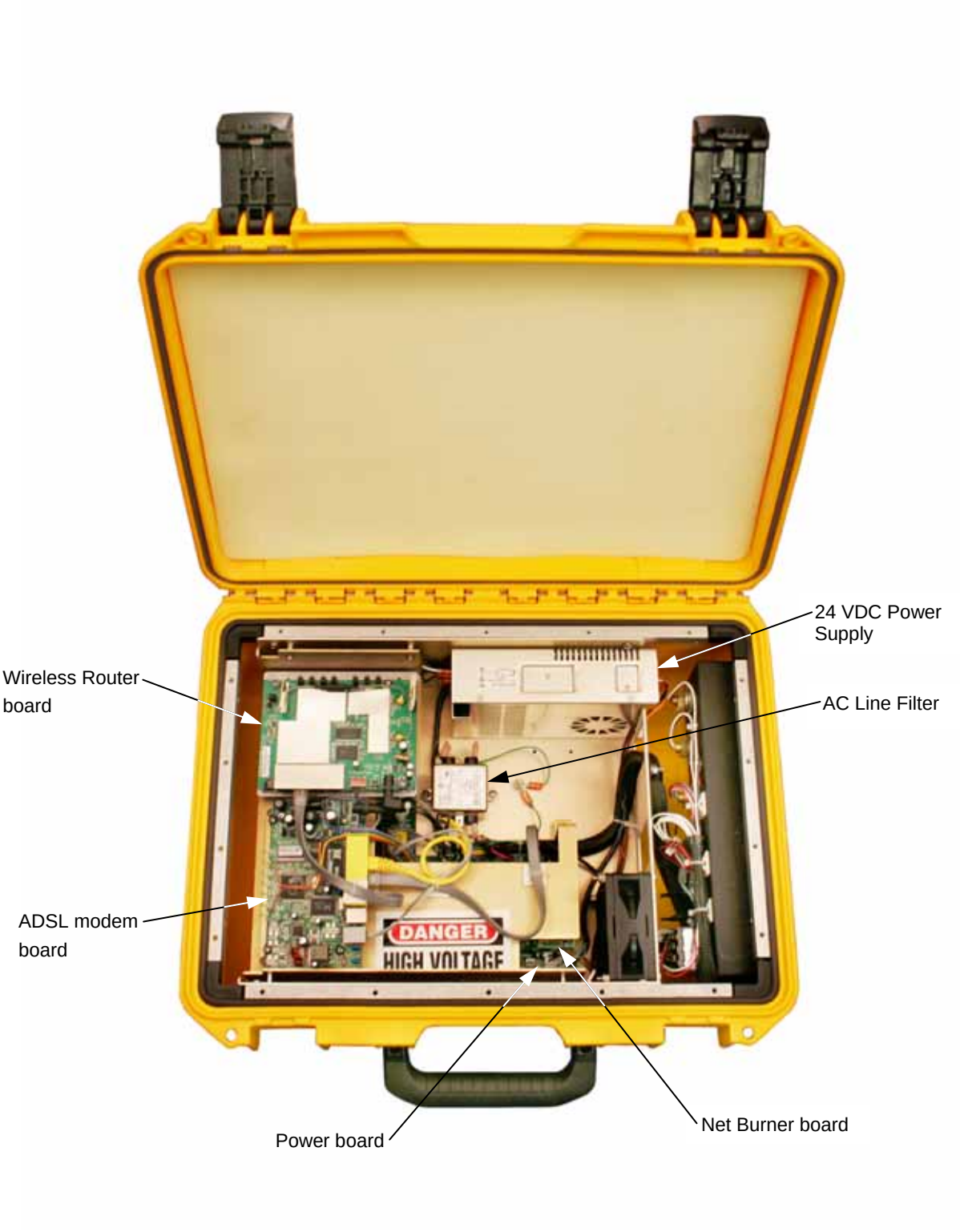


Figure 4-6: 4200-P Portable Topside Processor Chassis

AC Line Filter. The AC Line Filter filters the AC power input and outputs the filtered power to the 24 VDC Power Supply.

ADSL Modem. The ADSL Modem board converts the uplink data ADSL signals received from the tow vehicle and input on the ADSL connector from the Power board into Ethernet 10/100BaseT signals which are output to the laptop computer. Similarly, the ADSL Modem board converts the downlink Ethernet 10/100BaseT based command signals from the laptop computer into the ADSL downlink command signals which are output on the ADSL connector to the Power board for transmission to the tow vehicle. The ADSL Modem board also serves as an Ethernet switch to provide Ethernet connections on J2 to the laptop computer, on J3 to the Wireless Router and on J1 to the Net Burner board on the Power board, placing all of these devices on the same LAN. +12 VDC power is input on the DC connector from the Power board.

Net Burner. The Net Burner board mounts to and connects directly to the Power board to provide Power board diagnostics, tow vehicle power control, positive and negative trigger edge selection, and sensor monitoring. An Ethernet connection to the Net Burner board is provided on J3 from the ADSL Modem board. Power is input from the Power board.

Wireless Router. The Wireless Router connects to the ADSL Modem board over an Ethernet connection to provide a wireless Ethernet connection to the laptop computer that is on the same LAN as the wired Ethernet connection. Power is provided from the Power board.

4.1.3 701-DL Digital Link

A block diagram of the 701-DL Digital Link electronics is shown in Figure 4-7. The wiring diagram is shown in Figure 4-8 on page 4-11, and the electronics chassis is shown in Figure 4-9 on page 4-12. The main hardware elements in the 701-DL Digital Link include the following components and circuit boards:

Power. The Power board inputs +24 VDC on J1 from the 24 VDC Power Supply and generates the 400 VDC tow vehicle power which is output to the tow vehicle on J13 combined with the frequency shift keyed (FSK) responder trigger signal input on J10 and the ADSL downlink command and uplink data signals. The command signals are input and the data signals are output on J14. The Power board also includes +5, +12 and +15 VDC power supplies, where +12 VDC is output on J4 to the fan and on J6 to the ADSL Modem board.

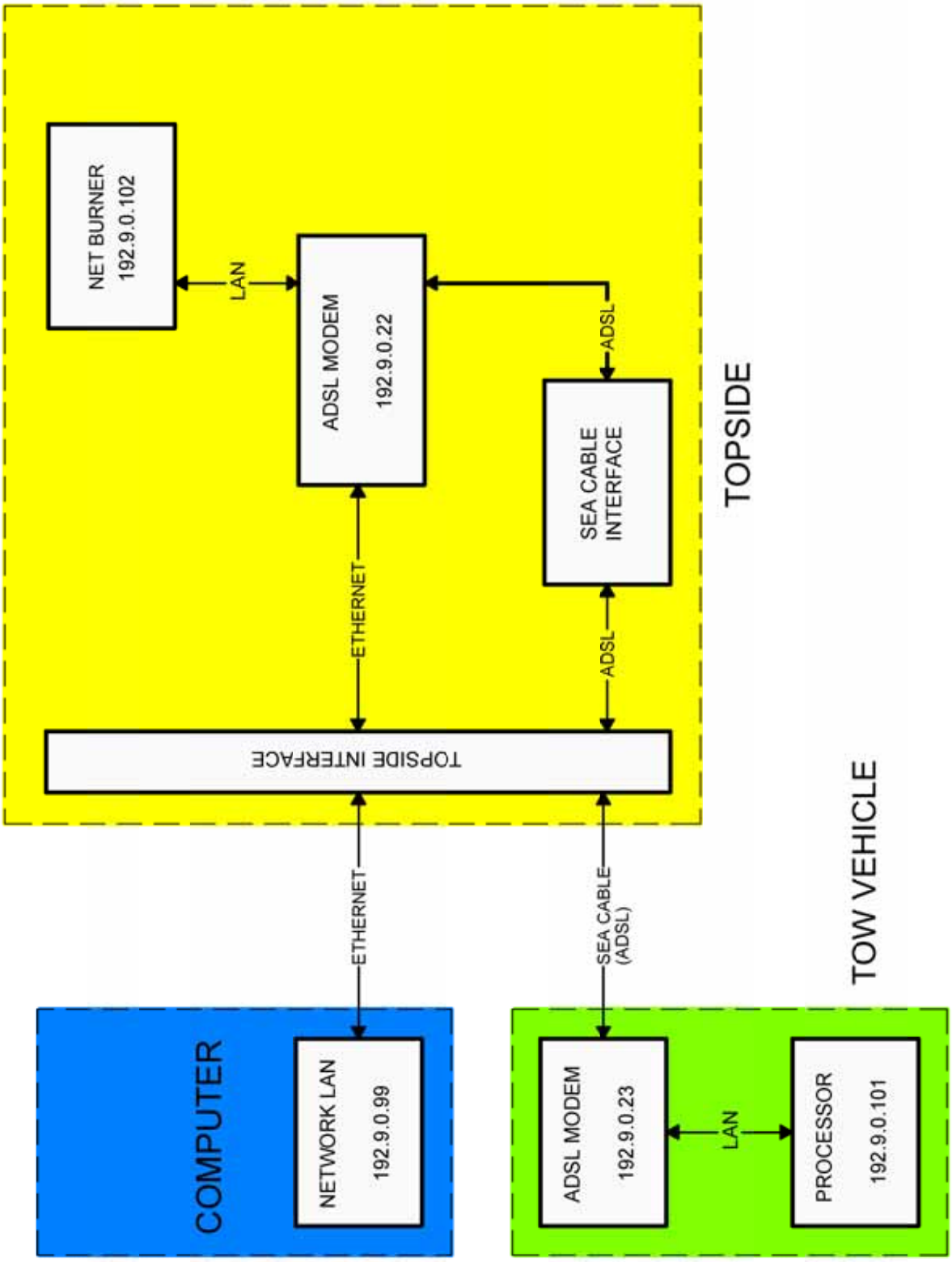


Figure 4-7: 701-DL Digital Link Electronics Overall Block Diagram

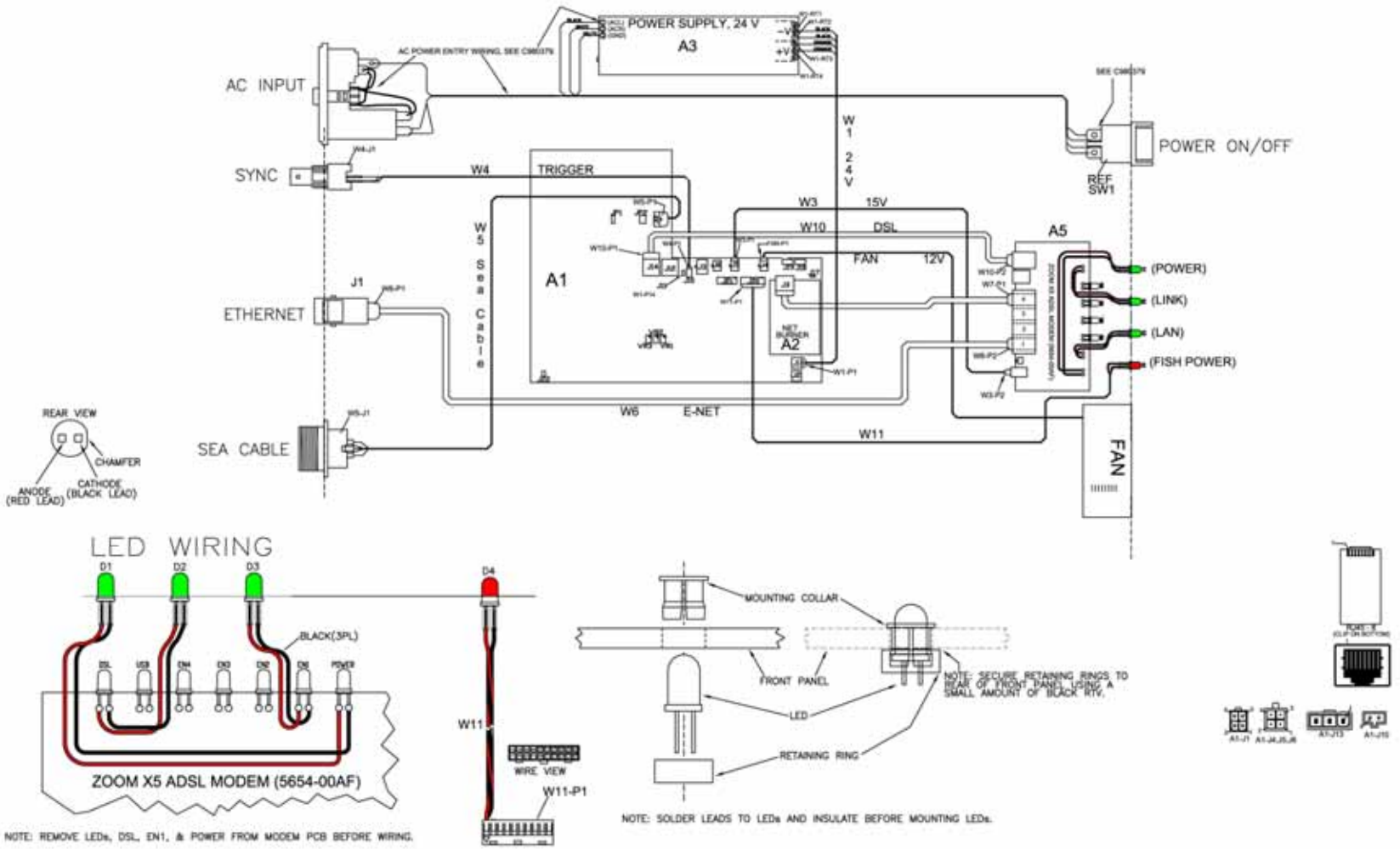


Figure 4-8: 701-DL Digital Link Wiring Diagram

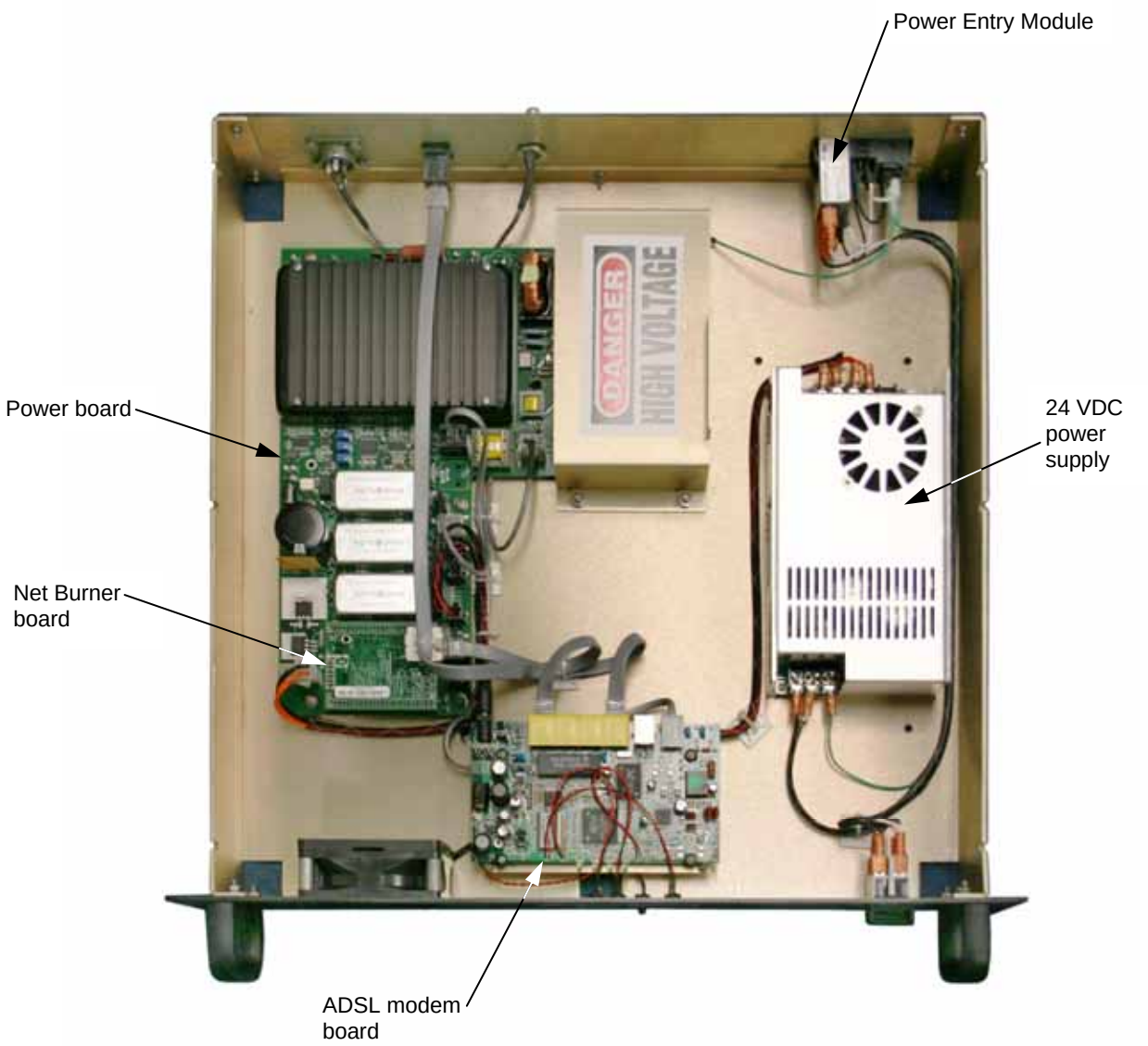


Figure 4-9: 701-DL Digital Link Chassis

24 VDC Power Supply. The 24 VDC Power Supply inputs AC power from the Power Entry module to generate +24 VDC which is output to the Power board.

Power Entry. The Power Entry module filters the AC power and connects it to the 24 VDC Power Supply through the front panel power switch.

ADSL Modem. The ADSL Modem board converts the uplink data ADSL signals received from the tow vehicle and input on the ADSL connector from the Power board into Ethernet 10/100BaseT signals which are output to the user supplied computer. Similarly, the ADSL Modem board converts the downlink Ethernet 10/100BaseT based command signals from the user supplied computer into the ADSL downlink command signals which are output on the ADSL connector to the Power board for transmission to the tow vehicle. The ADSL Modem board also serves as an Ethernet switch to provide Ethernet connections on J1 to the user supplied computer, on J3 to the Wireless Router and on J4 to the Net Burner board on the Power board, placing all of these devices on the same LAN. +12 VDC power is input on the DC connector from the Power board.

Net Burner. The Net Burner board mounts to and connects directly to the Power board to provide Power board diagnostics, tow vehicle power control, positive and negative trigger edge selection, and sensor monitoring. An Ethernet connection to the Net Burner board is provided on J3 from the ADSL Modem board. Power is input from the Power board.

4.2 Tow Vehicle

A block diagram of the 4200 Series Tow Vehicle electronics is shown in Figure 4-10 for both the 100/400 kHz and 300/900-kHz systems. The wiring diagram is shown in Figure 4-11 on page 4-16, and the electronics chassis is shown in Figure 4-12 on page 4-17. The electronics chassis contains all of the tow vehicle circuit boards along with the optional pressure sensor. The circuit boards are the following:

Power Distribution. The Power Distribution board inputs the tow vehicle 400 VDC power on J1 from the topside processor over the coaxial tow cable and filters it from the frequency shift keyed (FSK) responder trigger signals and the ADSL downlink command and uplink data signals. The command signals are input and the data signals are output on J2. The Power Distribution board also includes DC to DC converters which convert the 400 VDC to +48, +12, -12, and -5 VDC. The +48 VDC is output on J4 to the Amplifier boards. The other voltages are output on J6 to the ADSL Modem board, J5 to the CPU board, J7 to the Sonar Interface board, J8 to the Option connector, and J9 and J11 to the fans.

ADSL Modem. The ADSL Modem board converts the downlink command ADSL signals received from the topside processor and input on J2 from the Power Distribution board into Ethernet 10/100BaseT signals which are output on J1 to the CPU board. Similarly, the ADSL Modem board converts the uplink Ethernet 10/100BaseT based data signals from the CPU board into the ADSL uplink data signals which are output on J2 to the Power Distribution board for transmission to the topside processor. The ADSL Modem board also outputs the FSK responder trigger signals on J5 to the Sonar Interface board and to the optional Responder board. +12 and -12 VDC power is input on J8 from the Power Distribution board.

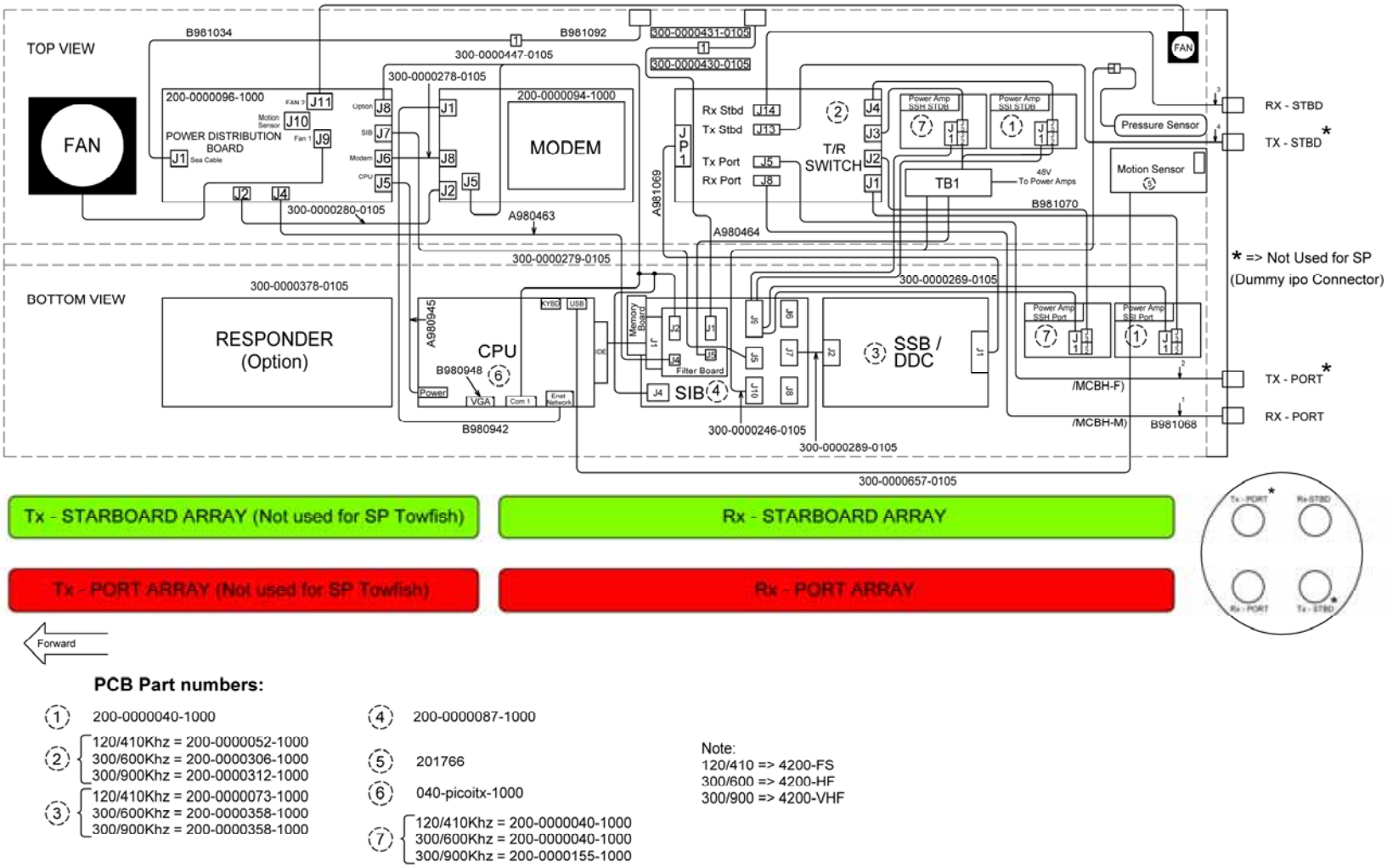
T/R Switch. The T/R Switch board provides the transmit/receive function for the side scan transducer arrays, allowing them to be used both as acoustic transmitters and as acoustic receivers simultaneously. Transmit signals are input from the Power Amplifier board as follows:

J1: Port low frequency transmit

J2: Port high frequency transmit

J3: Starboard high frequency transmit

J4: Starboard low frequency transmit



PCB Part numbers:

1. 200-0000040-1000
2. 120/410Khz = 200-0000052-1000
   300/600Khz = 200-0000306-1000
   300/900Khz = 200-0000312-1000
3. 120/410Khz = 200-0000073-1000
   300/600Khz = 200-0000358-1000
   300/900Khz = 200-0000358-1000
4. 200-0000087-1000
5. 201766
6. 040-picoitx-1000
7. 120/410Khz = 200-0000040-1000
   300/600Khz = 200-0000040-1000
   300/900Khz = 200-0000155-1000

Note:
120/410 => 4200-FS
300/600 => 4200-HF
300/900 => 4200-VHF

Figure 4-10: Tow Vehicle Electronics Block Diagram

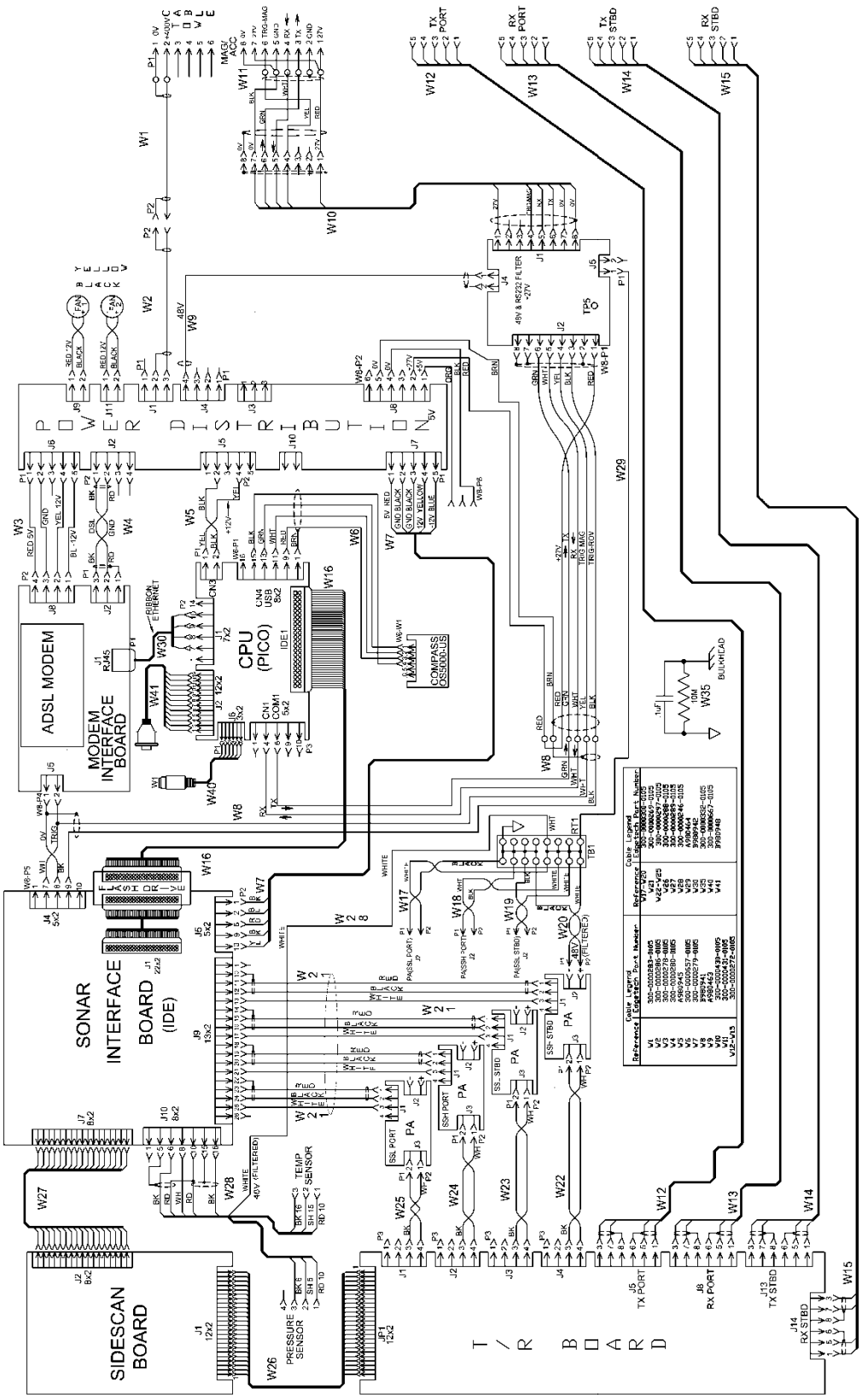


Figure 4-11: Tow Vehicle Electronics Wiring Diagram

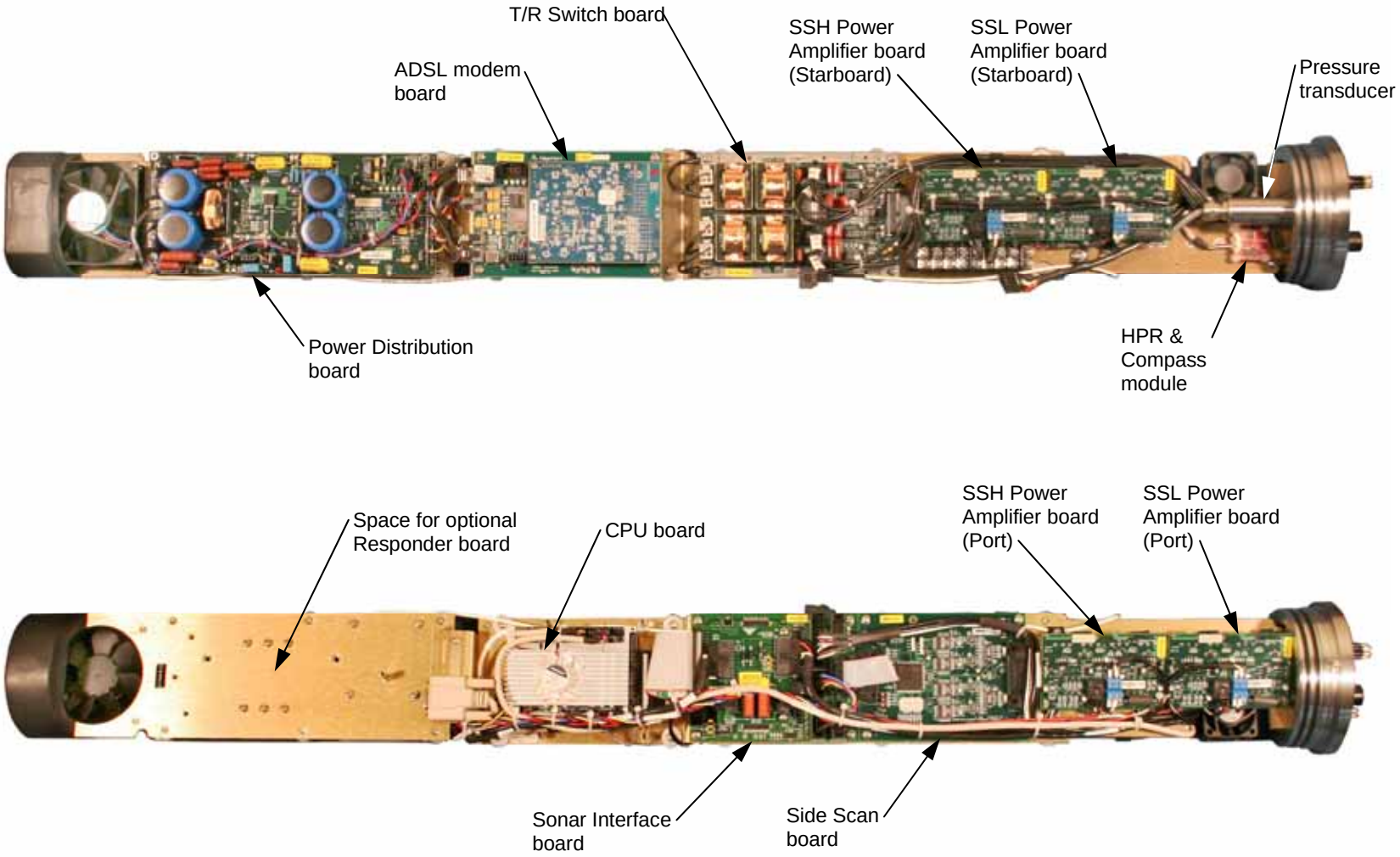


Figure 4-12: Tow Vehicle Electronics Chassis

Amplified transmit signals are output to the transducer arrays or received signals are input from the transducer arrays as follows:

J5: Port transducer array transmit (forward)

J8: Port transducer array receive (aft)

J13: Starboard transducer array transmit (forward)

J14: Port transducer array receive (aft)

The T/R Switch board also includes four noise reducing receiver preamplifiers, one each for the high and low frequency port transducer arrays and one each for the high and low frequency starboard transducer arrays.

Power Amplifier. There are four identical Power Amplifier boards, one each for the port high (SSH) and low (SSL) frequency transmit signals and one each for the starboard high and low frequency transmit signals. +48 VDC is input on J2 from the Power Distribution board, and the amplified outputs are output on J3 to the T/R Switch board to drive the transducer arrays. On/off control signals, along with the low level transmit signals, are input on J1 from the Sonar Interface board.

CPU. The CPU board runs an embedded version of the Microsoft Windows XP operating system and includes a 512-MB flash memory with C and D partitions. The C partition contains the operating system, and the D partition contains the sonar application software. The CPU board inputs downlink commands from the topside processor over the Ethernet connection on J1 with the ADSL Modem board while it outputs the uplink sonar data to the topside processor over the same connection. In addition to these functions, the CPU provides the chirp matched filter processing, power up diagnostic self tests, and pointing device and keyboard inputs for factory test. The COM1 serial port of the CPU board interfaces with an optional magnetometer, and the USB port interfaces with the compass. +12 VDC power is input from the Power Distribution board.

Sonar Interface. The Sonar Interface board converts the digital chirp high and low frequency transmit signals for the 100/400-Khz frequency systems into corresponding low level analog signals which are output on J9 to the Power Amplifier boards. In addition, signals from an optional pressure sensor and an internal temperature sensor are input on J10, the FSK responder trigger signals are input on J4, and the digitized received sonar signals from the Side Scan board are input on J7. Test points and indicators for the transmit signals and IDE interface logic for the Side Scan board are also included. +5, +12 and -12 VDC power is input on J5 from the Power Distribution board.

DDC. The DDC board is used in place of the sonar interface board for the 300/600 and 300/900-KHz systems.

Side Scan. The Side Scan board provides analog to digital conversion of the received sonar signals which are input on J1 from the T/R Switch board. The digitized signals are output on J2 to the Sonar Interface board. Indicators on the Side Scan board illuminate when signals are being received.

Compass. The Compass board provides heading, pitch and roll outputs to the USB port of the CPU board.

Responder. The optional Responder board inputs a responder trigger internally from the tow vehicle or from the topside processor. When triggered, the responder board drives up to 200 watts of power into an acoustic transducer mounted in the nose of the tow vehicle. The transmit frequencies are 24 to 28-kHz chirp or 27-kHz CW (continuous wave).

SECTION 5: Maintenance and Troubleshooting

The 4200 Series High Definition Dual Frequency Side Scan Sonar System is ruggedly designed and built and therefore requires little maintenance. However, to ensure long lasting and reliable service, some periodic maintenance is recommended. This section provides some maintenance recommendations and includes instructions on how to disassemble and reassemble a tow vehicle should it be required to replace internal components. In addition, some troubleshooting procedures are included, along with connector pin-out and wiring information, to assist in identifying and correcting possible setup or operational problems should they occur.

5.1 Periodic Maintenance

Maintenance on the 4200 Series High Definition Dual Frequency Side Scan Sonar System should be performed on a regular basis, as often as necessary, depending on use. However, most of the maintenance is performed after each deployment and recovery cycle of the tow vehicle. Other maintenance, such as cleaning of the air filter in the 4200 Rack Mount Topside Processor, can be performed as necessary. Maintenance is not required for the 4200-P Portable Topside Processor or the 701-DL Digital Link.

5.1.1 Cleaning the Air Filter in the 4200 Rack Mount Topside Processor

The 4200 Rack Mount Topside Processor includes an air filter located behind the front panel vent. Keeping the air filter clean will prevent heat buildup that can cause damage to heat sensitive electronics. The filter should be cleaned regularly, as often as necessary, to ensure that it remains clean. To access the filter, open the front panel vent, and then slide the filter out by pulling it to the right. Clean the filter using a vacuum cleaner or compressed air.

5.1.2 Cleaning the 4200-P Portable Topside Processor

The 4200-P Portable Topside Processor requires no maintenance other than light vacuuming of its internal components. To access the inside of the case, flip open the two latches and open the case.

5.1.3 Cleaning the 701-DL Digital Link

The 701-DL Digital Link requires no maintenance other than cleaning of the cooling fan on the front panel. To clean the fan lightly vacuum it from the front.

5.1.4 Inspecting and Cleaning the Tow Vehicle and Tow Cable after Use

After retrieving the tow vehicle from the water, use a hose to wash it down, along with the tow cable, with clean, fresh water. Thoroughly spray the transducer arrays and remove any buildup of debris. Inspect the cables and connectors for any damage and check for loose connections. Also inspect the tow cable and the connectors on each end.

After washing down the tow vehicle, clean the transducer arrays using a mild, non-abrasive detergent and water. Do not use any abrasive detergents or ammonia based cleaners. After cleaning, thoroughly spray the transducer arrays again with fresh water.

5.1.5 Inspecting and Cleaning the Underwater Connectors

Regularly inspect the contacts on the male pins of each underwater connector in the tow vehicle and on the tow cable for corrosion or oxidation. To remove any oxidation, rub the contacts lightly with 800 grit emery cloth cut into strips equal to or less than the width of a contact. A pencil eraser can also be used for this purpose. The female sockets can be cleaned using a cotton swab and rubbing alcohol. A .22 caliber bore brush with only nylon bristles can be used to remove light oxidation.

To extend the life and increase the reliability of the connectors, apply a thin film of silicone dielectric grease, such as Novagard G624 general purpose silicone grease or an equivalent, to the entire surface of each male pin. A small amount of grease should also be applied to the opening of each female socket.

> ***NOTE:*** **Remember to always install dummy connectors on the connectors of the tow cable and the tow vehicle tow cable connector.**

5.1.6 Storage

When not in use, all the components of the 4200 Series High Definition Dual Frequency Side Scan Sonar System should be packed in their original shipping containers in the same manner in which they were originally shipped and stored in a dry area.

5.1.7 Recommended Spares

Spares, such as circuit boards, power supplies, cables, and other critical items should be purchased at the same time as the system is purchased, as some original equipment manufactured (OEM) components may change. All spares are optional. For a list of recommended spares at the time of the system purchase, contact Edgetech sales.

5.2 Restoring the Operating System to the Hard Drive

The 4200 Rack Mount Topside Processor contains a 160-GB hard drive for both the operating system and the application software. A separate 1-TB hard drive is also included for data recording. An image file of the 160-GB hard drive is provided on a CD. This CD can be used to completely restore the 160-GB hard drive to its original shipped factory configuration in the unlikely event of its failure. For instructions on how to restore the operating system, refer to APPENDIX B: "System Backup and Restore."

5.3 Disassembling and Reassembling a Tow Vehicle

The procedures below describe how to disassemble and reassemble a tow vehicle to access and remove the electronics chassis. The tools required are a 5-mm allen wrench, a Phillips crew driver and a pair of needle nosed pliers.

WARNING!

High voltages that can cause injury or death are present in the tow vehicle. Turn off the topside processor and disconnect the tow cable before disassembling the tow vehicle.

5.3.1 Disassembling the Tow Vehicle

To disassemble the tow vehicle:

1. Place the tow vehicle on a clean, dry, flat surface.
2. Loosen the thumb screw at the back of the tail cone, and then remove the two tail fins, one at a time.

Figure 5-1: Removing the Tail Fins from the Tail Cone

3. Remove the thumb screw from the tail cone and set it aside.

Figure 5-2: Removing the Thumb Screw from the Tail Cone

4. Using the 5-mm allen wrench, loosen the five tail cone mounting screws enough such that they separate from the housing, and then remove the tail cone. It is not necessary to completely remove the screws.

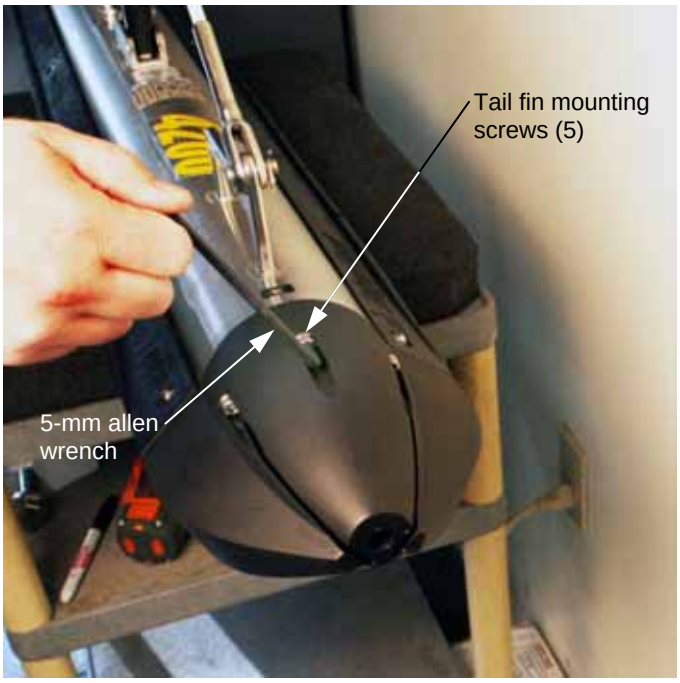


Figure 5-3: Removing the Tail Fin Mounting Screws

5. Remove the tail cone.

Figure 5-4: Removing the Tail Cone

6. Disconnect all four transducer cables from the connector end cap.

Figure 5-5: Disconnecting the Transducer Cables

7. Using the Phillips screw driver, remove the finish washer from the side of the housing.

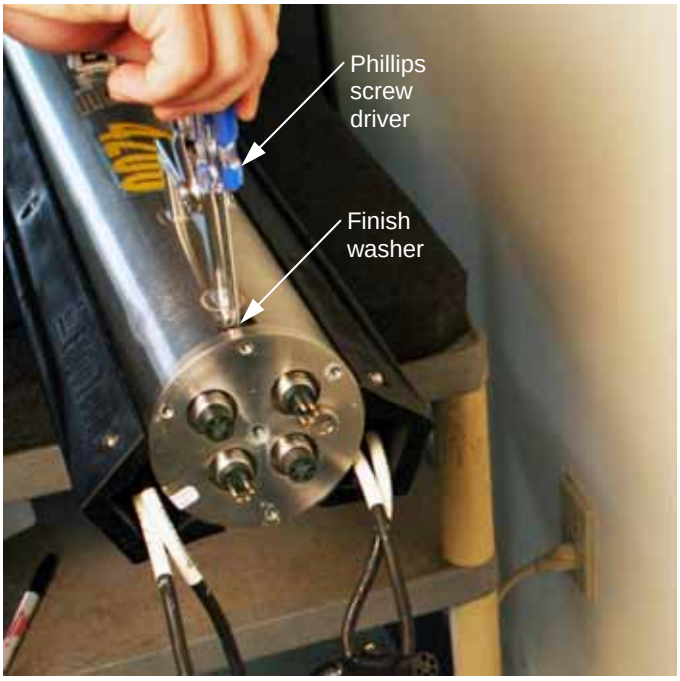


Figure 5-6: Removing the Finish Washer

8. Using the needle nosed pliers, grip the nylon retaining line and pull it completely out of the housing (it is sometimes necessary to push on the end cap to remove the nylon line, using the supplied handle helps facilitate this).

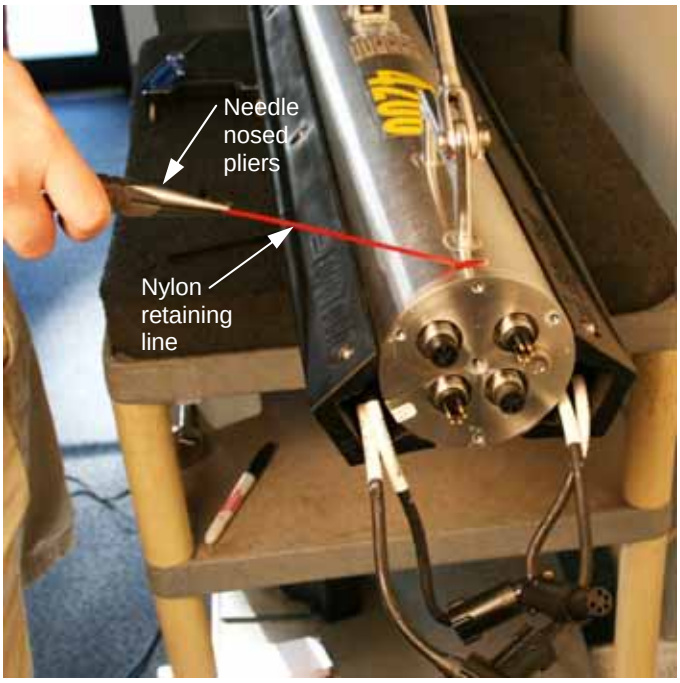


Figure 5-7: Pulling out the Nylon Retaining Line

9. Attach the supplied end cap removal handle to the end cap using the mounting screws. Finger tighten the screws only.

Figure 5-8: Attaching the End Cap Removal Handle

10. Using the handle, carefully pull the end cap straight out until the electronics chassis is extracted—but no more than five or six inches—from the housing.

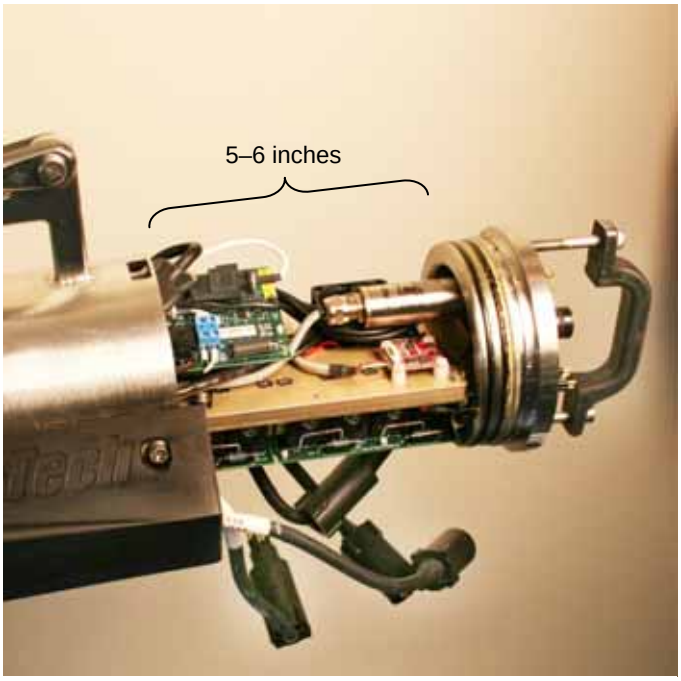


Figure 5-9: End Cap Extracted from Housing

11. Disconnect the tow cable and option connectors.
12. Slide the electronics chassis completely out of the housing and lay it on a clean flat surface.
13. If it is desired to reconnect the tow cable and option connectors for troubleshooting and test purposes, place the electronics chassis alongside the housing and reconnect the connectors.

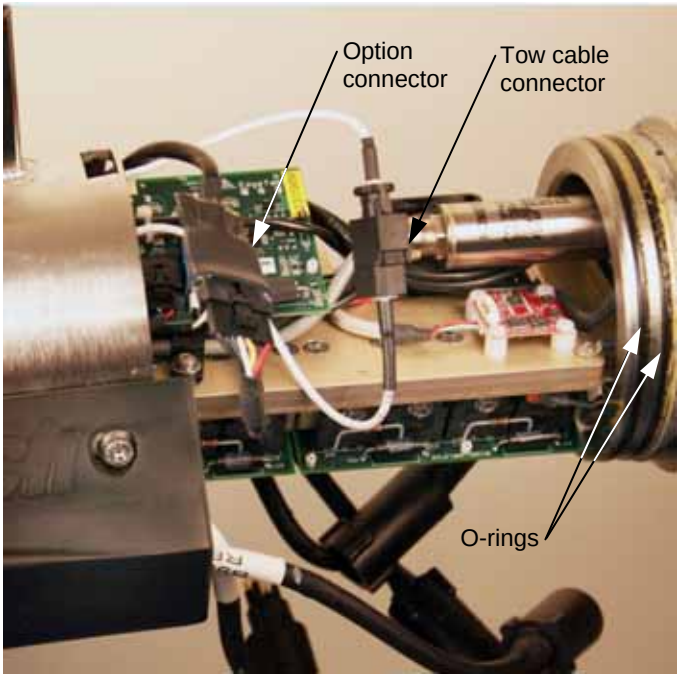


Figure 5-10: Tow Cable and Option Connectors

WARNING!

With the tow vehicle powered, high voltages that can cause injury or death are present on the electronics chassis. Use caution when working on the electronics chassis with the tow vehicle powered.

5.3.2 Reassembling the Tow Vehicle

Before reassembling the tow vehicle, clean the two O-rings on the end cap with a lint free paper towel and inspect them for any scratches, nicks or dirt. These O-rings are shown in Figure 5-10. If any of these conditions exist for an O-ring, discard the O-ring and install a new one. When installing a new O-ring, first clean the O-ring surfaces on both the housing and the end cap with the paper towel, and then apply a *light* coating of silicone lubricant to the new O-ring around its entire surface and install it. If no scratches, nicks or dirt are found when cleaning the O-rings, leave them installed and apply a *light* coat of silicone grease only.

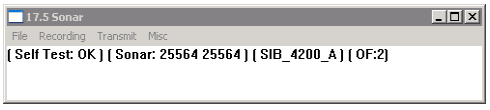
To reassemble the tow vehicle, reverse the disassembly procedure. However, when reassembling the end cap to the housing, align it first with+ the locating pin on the housing.

5.4 Calibrating the Compass

The compass in the tow vehicle is factory calibrated and should not require further adjustment. However, if it is suspected that the heading information is not accurate, the compass should be re-calibrated. Calibrating the compass requires a flat, easily rotated, continuously level platform on which to lay the tow vehicle. Mark the four cardinal points (0, 90, 18, and 270 degrees) on the platform using a hand held compass. There are two compass calibration procedures: "hard iron" and "soft iron." Hard iron calibration cancels out the effects of magnetized ferrous materials near the compass for all three magnetic sensing elements: X, Y and Z. Soft iron cancels out the effects of nonmagnetized ferrous materials. The hard iron calibration should be performed first, followed immediately by the soft iron calibration.

To perform the hard iron calibration:

1. Set up the platform with the tow vehicle on it well away from any metal objects, such as buildings or cars.
2. Activate the system as described in “System Activation and Test” on page 3-23 for your system.
3. Verify that the platform remains level to within a degree when rotating it 360 degrees by observing the Pitch and Roll displays.
4. Using the remote desktop program Choose Start/Programs/Accessories/Communications/HyperTerminal.
5. Close the Sonar window on the desktop:



6. In the Connect To dialog box, select COM2 from the Connect Using drop-down list box, and then click OK.
7. In the Port Settings dialog box, click Restore Defaults.
8. Select 19200 from the Bits per second drop-down list box, and then click OK.

   The COM2 window opens.
9. Confirm that there are data being received in the COM2 window as shown in Figure 5-11.
10. Press <Esc>, and then uppercase "C."

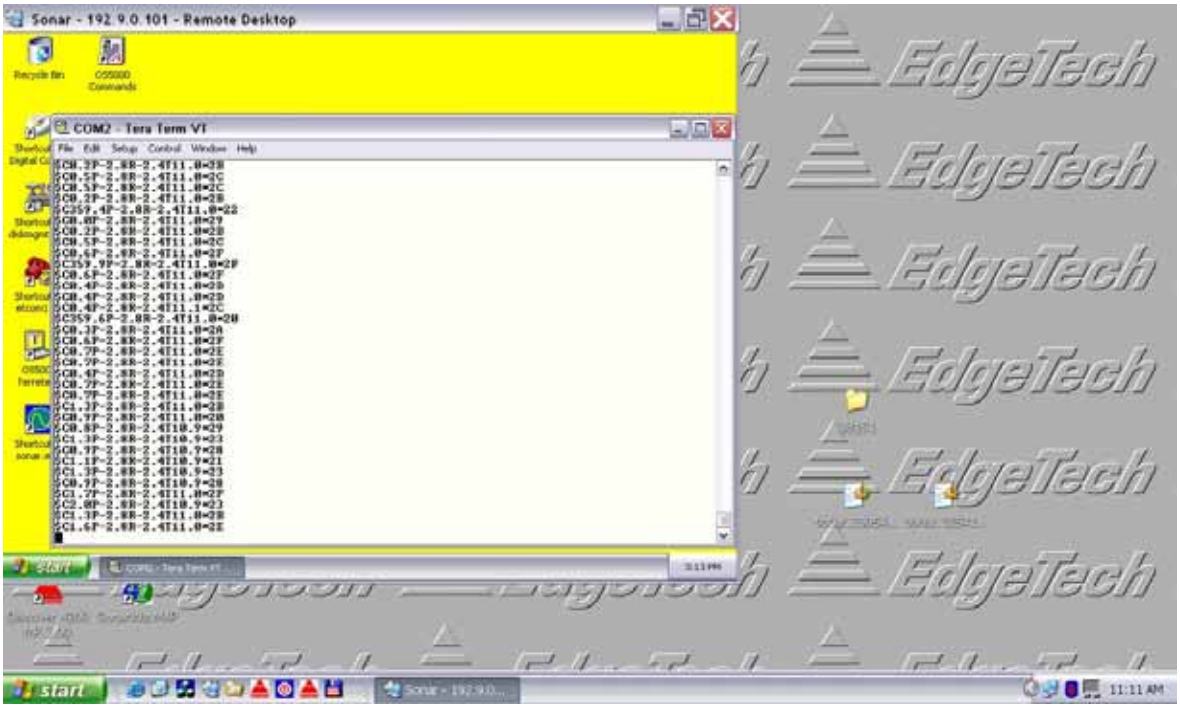


Figure 5-11: The COM2 Window in HyperTerminal

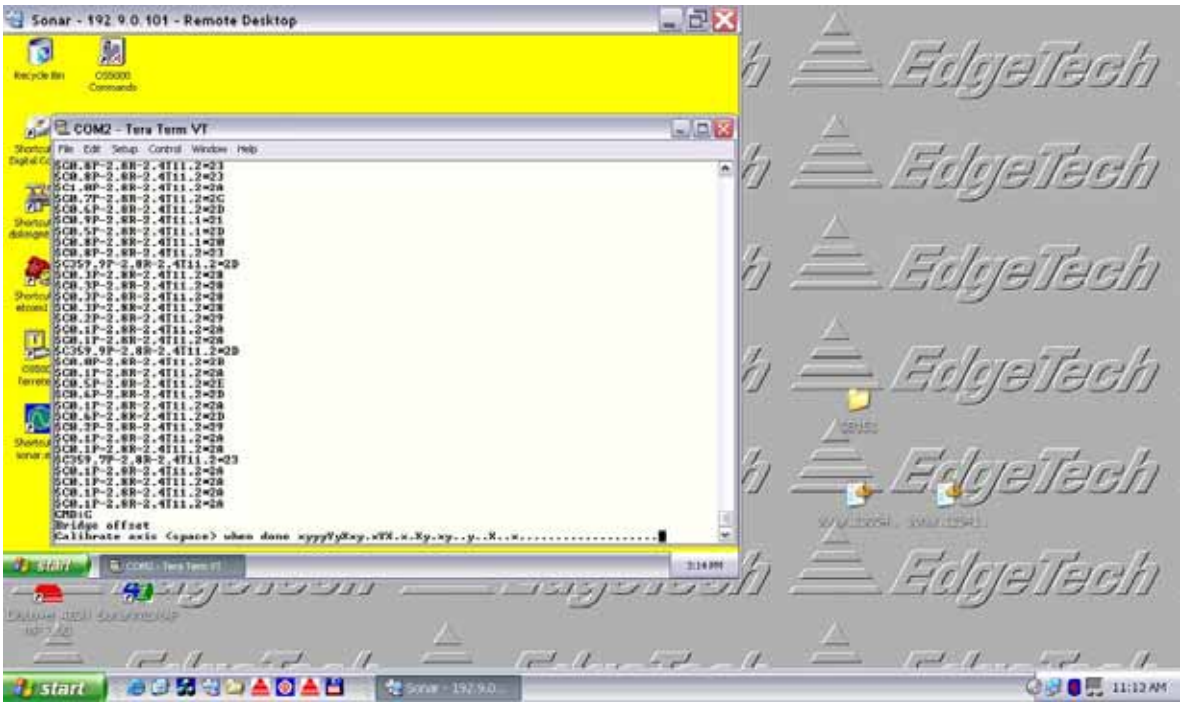

Sonar - 192.9.0.101 - Remote Desktop
COM2 - Tera Term VT
File Edit Setup Control Window Help
Bridge offset
Calibrate axis <space> when done
EdgeTech

Figure 5-12: Hard Iron X Y Calibration Complete

11. Slowly rotate the tow vehicle at least 360 degrees, taking at least 20 seconds to do so, and stopping the calibration by pressing the Space bar when "….." is observed in the COM2 window as shown in Figure 5-12.
12. Turn the tow vehicle 90 degrees on its side such that the towing arm is parallel to the platform.
13. Press <Esc>, and then uppercase "Z."
14. Slowly rotate the tow vehicle at least 360 degrees, taking at least 20 seconds to do so, and stopping the calibration by pressing the Space bar when "….." is observed in the COM2 window as shown in Figure 5-13.

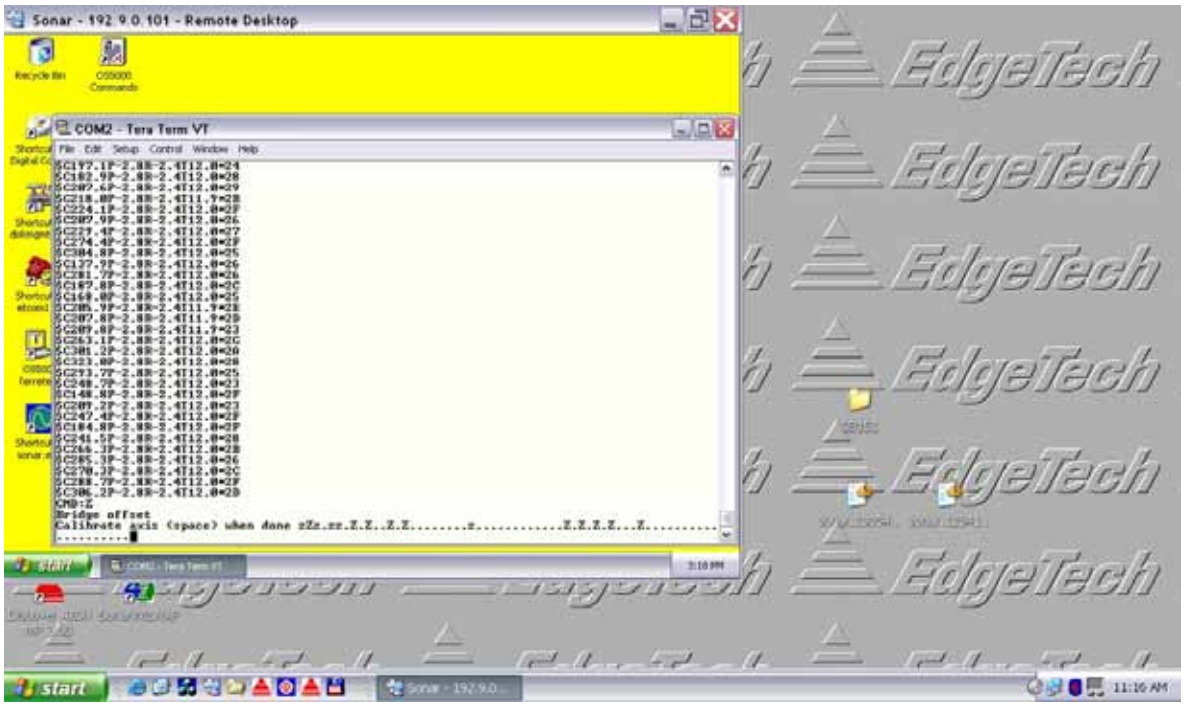


Figure 5-13: Hard Iron Z Calibration Complete

To continue with the soft iron calibration:

15. Return the tow vehicle to its upright position.
16. Press <Esc>, and then $.

NOTE: **The tail of the tow vehicle is the north reference.**

17. Select option 2, and then follow the screen prompts using the compass as shown in Figure 5-14 to ensure accurate alignment as follows:
    - Align platform exactly north, 0 degrees, and then press the Space bar.
    - Align exactly east, 90 degrees, and then press the Space bar.
    - Align exactly south, 180 degrees, and then press the Space bar.
    - Align exactly west, 270 degrees, and then press the Space bar.

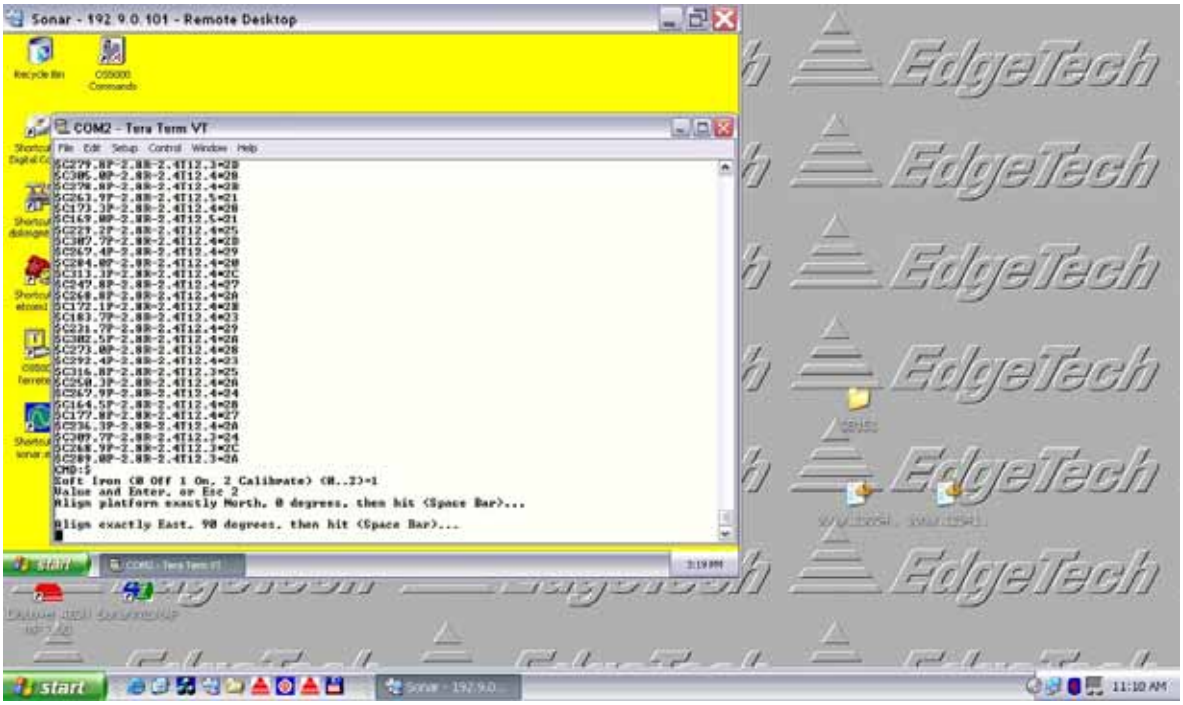

Sonar - 192.9.0.101 - Remote Desktop
COM2 - Tera Term VT
Soft Iron (0 Off 1 On, 2 Calibrate) (0..2)=1
Value and Enter, or Esc 2
Align platform exactly North, 0 degrees, then hit (Space Bar)...
Align exactly East, 90 degrees, then hit (Space Bar)...
EdgeTech
start

Figure 5-14: Soft Iron Calibration Screen Prompts

18. Align the tow vehicle with each of the cardinal points again, one at a time, while observing the Heading display, and verify that the heading is accurate at each point.
19. Double click the Sonar.exe icon ( ) on the desktop or turn the tow vehicle power off and then on again.

    The Sonar window will open again.

5.5 General Troubleshooting

Should some operational or performance problems occur with the 4200 Series High Definition Dual Frequency Side Scan Sonar System, it may be possible to correct them using the troubleshooting guides in the following pages. For the 4200 Rack Mount, 4200-P Portable and 701-DL Topside Processors, tabular troubleshooting guides are provided in Table 5-1, Table 5-2, and Table 5-3, respectively. These troubleshooting guides identify some symptoms that could occur and presents one or more possible causes and the recommended corrective action for each. Perform the corrective action for any given symptom in the order of possible causes, which generally corresponds to the degree of troubleshooting difficulty, from the simple to the more complex.

For the tow vehicle, detailed information is provided in “Tow Vehicle Troubleshooting Guide” on page 5-19.

Before proceeding with any corrective action, verify that the topside processor is plugged into an appropriate AC or DC power source and that the processor is switched on.

> ***NOTE:*** **Be sure to also verify that all the cables on the topside processor and the tow vehicle are mated and are not loose or damaged. Most causes of operational or performance problems are a result of poor connections.**

5.6 4200 Rack Mount Topside Processor Troubleshooting Guide

Table 5-1: 4200 Rack Mount Topside Processor System Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
The green SYSTEM indicator on the topside processor does not illuminate when the processor is turned on.	The POWER switch is not turned on.	Verify that the POWER switch on the back panel is on.
	No AC power.	Verify that the topside processor is connected to AC power. Check the AC power source.
	The indicator is not operating.	Open the topside processor and check the indicator and wiring.
The red HARD DISK indicator on the topside processor does not flash when the processor is turned on.	The operating system is not booting.	Open the topside processor and verify that the 160-GB hard drive is connected to power and that the ribbon cable is properly plugged in. Also verify that the ribbon cable in properly plugged into to the CPU board.

The red HARD DISK indicator on the topside processor does not flash when the processor is turned on. **(Cont.)**	The indicator is not operating.	Open the topside processor and check the indicator and wiring.
The red TOWFISH indicator on the topside processor does not illuminate when the processor is turned on.	The TOWFISH POWER switch is not switched on.	Verify that the TOWFISH POWER switch was pressed and wait 10 seconds for the indicator to light.
	The indicator/switch is not operating.	Open the topside processor and check the indicator and wiring.
The red TOWFISH indicator on the topside processor illuminates after 10 seconds then after 20 seconds turns off.	Tow cable is not connected between topside and towfish.	Check tow cable connections to rear panel of topside and connection to towfish.
	Tow cable is faulty.	Check continuity between connectors and proper wiring.
	4200 power board is faulty.	Verify that RED LED D2 turns on after 10 seconds.
	24V power supply not functioning.	Turn on TOWFISH POWER switch and verify that internal power supply turns on. Check input to supply 120/220VAC. Check output of supply 24VDC.
	4200 Towfish faulty.	Verify towfish on different topside. Verify topside on different towfish.
The Discover reports "Cannot ping towfish."	Tow cable disconnected.	Check tow cable connections.
	LAN settings are not properly setup.	Refer to section 3.7 for TCP/IP address settings.
	Modem settings incorrect.	Refer to APPENDIX C for modem settings.
	Modem disconnected internally on topside.	Check all connections to modem are correct per Document No. 990-0000046-1000.
	Improper settings in Discover.	Check that under "Configuration" pull down "Network" the displayed address is 192.9.0.101 with "Port" set to 1700.
	4200 Towfish faulty.	Verify towfish on different topside. Verify topside with a different 4200 towfish.

5.7 4200-P Portable Topside Processor Troubleshooting Guide

Table 5-2: 4200-P Portable Topside Processor System Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
The red POWER indicator on the portable topside does not illuminate when the unit is turned on.	The POWER switch is not turned on.	Verify that the POWER switch is on.
	No AC power. When using AC power connector.	Verify that the topside processor is connected to AC power. Check the AC power source. Verify that the fuse is good.
	No DC power. When using DC power connector.	Verify that DC/Enet cable is connected to DC power source with voltage 20-36VDC.
	5 amp Fuse on side panel of topside bad.	Check fuse for continuity. Replace if necessary.
	The indicator is not operating.	Open the topside processor and check the indicator and wiring.
The green SYSTEM READY indicator on the portable topside flashes when the processor is turned on.	The Discover software has not connected to the topside.	Wait 1 minute after topside is switched on. Check LAN connections between topside and laptop.
	Discover software incorrectly setup.	Check Software settings, Network settings on laptop section 3.7 TCP/IP address setup.
	The indicator is not operating.	Open the topside processor and check the indicator and wiring.
The yellow LINK OK indicator on the portable topside flashes when the topside is turned on. After 1 minute flashing should stop and indicator should remain lit.	Tow cable between portable and towfish is disconnected or faulty.	Check connections and tow cable.
	Modem settings on the portable topside are incorrect.	Refer to APPENDIX C for modem settings.
	4200 towfish is faulty.	Check topside on different towfish.

The red FISH POWER indicator on the portable topside illuminates after 10 seconds then after 20 seconds turns off.	Tow cable is not connected between topside and towfish.	Check tow cable connections to rear panel of topside and connection to towfish.
	Tow cable is faulty.	Check continuity between connectors and proper wiring.
	4200 power board is faulty.	Verify that RED LED D2 turns on after 10 seconds.
	4200 Towfish faulty.	Verify towfish on different topside. Verify topside on different towfish.
The Discover reports "Cannot ping towfish."	LAN cable disconnected.	Check LAN cable connection.
	Tow cable disconnected.	Check tow cable connections.
	LAN settings are not properly setup.	Refer to section 3.7 for TCP/IP address settings.
	Modem settings incorrect.	Refer to APPENDIX C for modem settings.
	Modem disconnected internally on topside.	Check all connections to modem are correct per Document No. 990-0000046-1000.
	Improper settings in Discover.	Check that under "Configuration" pull down "Network" the displayed address is 192.9.0.101 with "Port" set to 1700.
	4200 Towfish faulty.	Verify towfish on different topside. Verify topside with a different 4200 towfish.

5.8 701-DL Digital Link Troubleshooting Guide

Table 5-3: 701-DL Digital Link Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
The green POWER indicator on the topside does not illuminate when the unit is turned on.	The POWER switch is not turned on.	Verify the POWER switch is on.
	No AC power. When using AC power connector.	Verify that the topside processor is connected to AC power. Check the AC power source. Verify that the fuse is good.
	5 amp Fuses on rear panel of topside ac connection bad.	Check fuses for continuity. Replace if necessary.
	The indicator is not operating.	Open the topside processor and check the indicator and wiring.
The green LAN indicator on the topside does not illuminate when the unit is turned on.	There is no connection between the topside and the computer.	Check LAN connections between topside and laptop.
	The indicator is not operating.	Open the topside processor and check the indicator and wiring.
The green LINK indicator on the topside flashes when the topside is turned on. After 1 minute flashing should stop and indicator should remain lit.	Tow cable between topside and towfish is disconnected or faulty.	Check connections and tow cable.
	Modem settings on the topside topside are incorrect.	Refer to APPENDIX C for modem settings.
	4200 towfish is faulty.	Check topside on different towfish.
The red FISH POWER indicator on the topside illuminates after 10 seconds then after 20 seconds turns off.	Tow cable is not connected between topside and towfish.	Check tow cable connections to rear panel of topside and connection to towfish.
	Tow cable is faulty.	Check continuity between connectors and proper wiring.
	4200 power board is faulty.	Verify that RED LED D2 turns on after 10 seconds.
	4200 Towfish faulty.	Verify towfish on different topside. Verify topside on different towfish.

The Discover reports "Cannot ping towfish"	LAN cable disconnected.	Check LAN cable connection.
	Tow cable disconnected.	Check tow cable connections.
	LAN settings are not properly setup.	Refer to section 3.7 for TCP/IP address settings.
	Modem settings incorrect.	Refer to APPENDIX C for modem settings.
	Modem disconnected internally on topside.	Check all connections to modem are correct per Document No. 990-0000046-1000.
	Improper settings in Discover.	Check that under "Configuration" pull down "Network" the displayed address is 192.9.0.101 with "Port" set to 1700.
	4200 Towfish faulty.	Verify towfish on different topside. Verify topside with a different 4200 towfish.

5.9 Tow Vehicle Troubleshooting Guide

The 4200 series tow fish is a computer controlled device. Therefore in order to troubleshoot such a complex piece of equipment to a sub-module level, one must have the proper test equipment and thorough knowledge of the unit's electrical operation plus hardware aspects. The purpose of this section is not to develop those techniques nor provide a step-by-step procedure where one may start and end up at the point of failure. It is to give an operator some familiarity with the electronic hardware. The following sections provide some specific areas to check which are easily identifiable and certain clues as to what to look for in making an educated guess as to the source of the problem. This is only down to the module or PCB level.

The 4200 series tow fish is a software controlled computer system. There are also some analog sections that interface with the tow fish transducers. Being a digital device, many operating portions use the same data and address lines a failure of one may result in a failure of all. This makes it very hard to isolate some digital problems without the proper equipment and a thorough knowledge of the data flow. This equipment is not normally found on a vessel.

The primary objective is to ascertain which system component is at fault. First, ensure that the system is properly installed with all connections properly mated. Next, check that the line voltages for the topside components are within specified limits and any fuses have not blown. Fuses may fail if a wrong connection has been made during setup. They have also been known to fail for no apparent reason. Always replace fuses with those of the same value. If a fuse fails again within a short time, there are more serious problems within the corresponding unit.

Open the cover of the topside electronics and check that all the cards are seated, especially if the unit has been in transit. After checking the cards, ensure that the cable connectors are properly mated. If the problem still persists, disengage and then reengage all PC boards and do the same for all board cable connections, before going on to any electrical testing.

All calibration adjustments are preset at the factory and should not require any modifications in the field unless certain mechanical and/or electrical components are changed or the adjustments are inadvertently altered.

If the above checks do not identify or remedy the problem, attempt to isolate the failure to one of the major system components: the sonar processor, the modem/power unit, the tow fish, or the tow cable. The following presents various operational problems and general comments on where to look and what to look for.

The main objective is to get the basic system working. It is therefore good practice to disengage any option circuit cards installed in the unit and optional external system components at this time to reduce the number of possible trouble sources.

5.9.1 Equipment Required

Except for the topside processor/power unit, only common laboratory test equipment and tools are required for field troubleshooting. No special equipment is necessary. Typical test equipment includes:

- Digital multi-meter, Fluke or equivalent
- Oscilloscope
- Hi-pot tester

Capacitance meter

5.9.2 Transmission Verification

The EdgeTech Model 4200 series tow fish is different that the conventional side scan sonars used for many years. The early sonars were driven with a high-powered energy burst similar to hitting a bell with a hammer. The 4200 series transducers are driven with a smooth rising lower power signal that matches the transducer response. Because of this, there is no pronounced clicking noise emanating from the 4200's transducers when they are firing. Therefore the 'listen for the clicking noise' test cannot be used to verify sonar transmission during bench or on-deck testing.

Sniffing with an oscilloscope can be used as a substitute to check transducer firing. One way is to attach the scope probe's ground to the tow fish body and hold the open probe next to the transducer under test. Set to about 20 to 50mV /Div.

A second method is to connect a several-turn wire loop across the scope probe and move it over the transducer face. Electrical pickup should be noticed on the scope screen at each transmission burst. Remember that the transducers and elements within the transducer may be firing together or in sequence. One must make sure that the electrical pickup is not from an adjacent string.

5.9.3 Sonar Processor and Data Link

It is assumed that the sonar processor is up and working in order to complete system test and troubleshooting. Refer to the sonar processor's manual for its troubleshooting and diagnostic information.

The other thing is that the high-speed data must be up and running so that the topside and sub-sea units are communicating with each other. If the tow fish boots up correctly and passes its internal self-test, there will be a smooth sequence of rising tones going from 2 to 3.9 kHz. A set of tones jumping from 2 to 3 kHz means that self-test has failed. These tones are generated in software in the 4200-FS tow fish and replicated on the surface when an EdgeTech topside processor is used to access the Tow fish computer subsystem using the Remote Desktop application. The Self Test PASS tones repeat until data linkup has occurred between the topside Discover software, and tow fish. Self Test FAIL tones repeat indefinitely.

There will also be a video acknowledgement of successful self-test and linkup in the topside processor's Discover display window. Self-test status will also be displayed on an external video monitor if attached directly to the tow fish's CPU board's VGA connector.

If the topside processor is unavailable and the tow fish is dismantled, an external keyboard, mouse and video monitor may be connected to the tow fish's CPU board to provide some diagnostic testing. An external power unit will still be required.

5.9.4 Topside Power Unit

Tow fish power is supplied either from an individual power/modem unit or from an integrated topside processor. Voltage and current to the tow fish are important parameters. They must be within acceptable limits for the tow fish to work properly. Check the tow cable output voltage with the system connected and, if possible, the current drain with an inline connection. Cable current should be between 120mA (Idle) and 250mA.

The topside units supply 400VDC to the tow cable.

The voltage at the towfish end of the cable must be not less than 300VDC to start the system and not be less than 200V during operation.

5.9.5 Command and Data Link

To check that the command and data link over the tow cable is operational, start the Remote Desktop application on the topside control computer. There is normally a shortcut on the Edgetech Desktop for this. The tow fish's PC screen should appear in a window on

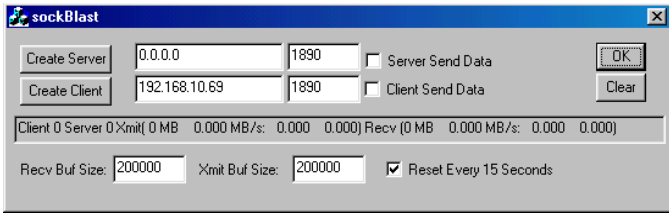
the topside computer screen. This will appear as a yellow desktop with the sonar application dialog box visible. If this is successful then the command link is working.

5.9.6 Data link

A good, quick qualitative test of the data link and tow fish electronics is to perform a rub test on each transducer. Set the Range to 200 meters for both frequencies and start the system running in HDM mode for both. Set screen gain to +30dB for both frequencies and briskly rub each aft transducer face one at a time. A dark band should appear on the sonar processor screen corresponding to the side rubbed.

Data throughput rates on the uplink (fish to topside) can be critical in getting smooth data from the tow fish. The data throughput rate can be checked using Edgetech supplied utilities at each end of the link

The SockBlast application is used to test network throughput between the 4200 series fish and the topside computer. This application is normally kept in C:\EdgeTech\Utilities folder on the topside unit, and D:\EdgeTech\Utilities folder on the towfish.



Two copies must be run one on each computer. One serves as the client (topside) and the other as the server (tow fish). Since the client connects to the server, the Create Client (topside) address must be the TCP/IP address of the server (fish) machine, which is 192.9.0.99. The tow fish Create Server address should be 0.0.0.0.

After pressing the Create buttons to start the server and clients on their respective machines, the two applications hook up, then the Client count on the tow fish should increment from 0 to 1 and the Server count on the topside should increment to 1 as well. This indicates that there is one connection between the two applications

Check the Server Send Data box on the tow fish. A performance in MB/second will be displayed. This should be more than 0.35Mbyte/s.

5.9.7 Towfish

First verify that the command and data links between the tow fish and topside are working per above.

NOTE: **It is recommended that all attempts be made to see if a problem is external to the towfish before opening it.**

WARNING!

High voltage (400 VDC) is always present in the electronics assembly when powered.

Preliminary

When the electronics has been removed:

1. Check that all boards are still secured to their mountings.
2. Check the mating of all connectors
3. Check that the terminal board screw connections are tight
4. Check for obvious hot /burn spots by sight and smell.

No Sonar Data

If the sonar display doesn't scroll, use the 'scope sniffing' approach as outlined in "Transmission Verification" on page 5-20 to check transducer firing. If the transducers are firing, and the data link is working, the problem is most likely related to the topside processor and/or data modem.

If the display scrolls but is blank and the transducers are firing, the problem most likely lies with either or a combination of the tow fish receiver, transducer or its signal processing circuitry. Establish if the problem is on a single channel or all channels.

If data is absent in all, or individual channels, check the T/R Switch and SSB boards. If the problem is with a particular channel, also check the respective power amplifier and transducer element.

Connect to tow fish using REMOTE DESKTOP 192.9.0.101 login: administrator, password: admin . Sonar application should be running and there should not be any errors posted to the window. Errors reported could be: "No Sonar Device Found", this will indicate that the CPU does not connect to the sonar processor card. "IF_DIAG" the sonar

processor has detected an error and will not run. Cycle power on tow fish recheck error, if the error is still present check the cables running to and from the sonar interface card. “HM_Sensors” this reports the 48 volts if this error is found check output of power distribution board in tow fish and also the power on the power amps.

Power Supplies

Several power supplies and voltage regulators are located throughout the towfish assembly. The main ones are located on the Power Distribution board. The first supply converts the 400VDC tow cable voltage to the operating +48VDC supply. Other DC/DC converters running off the 48 volts generate the low level operating supply voltages. No supplies are adjustable.

The following are the main voltage test points on the Power Distribution board.

Supply	Test Point	Return
+5 VDC +/-0.2V	TP7	TP12
+12 VDC +/-0.6V	TP8	TP12
-12 VDC +/-0.6V	TP9	TP12
+27 VDC +/-0.6V	TP10	TP12
+48 VDC +/-2.0V	TP4	TP5

Other voltages to check on the SSB board and labeled as such are:

Supply
+3.3 VDC +/-0.1
+5 VDC +/-0.2V
+12 VDC +/-0.6V
-12 VDC +/-0.6V

Test Lights

1. Power Distribution Board.

   Monitor the +400 volt D4 and +48 volt D8 LED’s. They should be on steady.

2. SSB Board.

   There are two LED’s of interest. ‘LED A’ flashes when 120 kHz is transmitting. ‘LED B’ flashes when 410 kHz is transmitting.

3. SIB Board.

   There are four LED's of interest. They have the following status when the system is operating properly.

   D1 Off D3 (Orange)Flashes at 2 Hz

   D2 Off D4(Green) On

SSB Board Test Points

1. GAIN A and B test points show the positive-going TVG ramp voltage for the low and high frequency sonar channels.
2. Four test points monitor the TVG'd analog sonar data. They are:

   ADC 0 Port SSLADC2 Stbd SSL

   ADC 1 Port SSHADC3 Stbd SSL

These test points are useful when doing a rub test.

DDC Test points

This board does not have any test points. LEDs monitors display the channels on the card that are running. Side A and Side B. In a normally operating fish with both channels collecting data the lights will alternate.

Modem Board Test Points

1. FSK.

   Monitors the 3200 kHz to 2800 kHz frequency-shift-keyed signal from the topside unit. This signal is used for optional commands. May not be present in all systems.

2. Trig.

   A TTL signal that synchronizes the topside and sub-sea units with other topside equipment. Follows the SYNC signal input on the topside unit. It is not used in all system configurations.

Other Checks

Periodically check the integrity of the sea ground capacitor attached to the rear bulkhead.

5.9.8 Tow Cables

Historically, most system problems occur in the tow cable and their connectors. Before proceeding, verify cable continuity from the shipboard end of the cable to the tow fish. The presence of a shorted or open wire in a tow cable can be determined by using a multi-meter. An open or shorted wire can be located using the techniques described in the following subsections.

Shorted Wire

The following procedure may be used to approximate the distance to a single short or a point of high leakage between a conductor pair or from a conductor to a shield.

1. Disconnect both cable ends.
2. Short the two connector pins (or wires if un-terminated) of the shorted pair at both ends and measure the total resistance between the ends.

   R1+R2 =_____
3. Remove the shorts.
4. Measure the resistance between a shorted pair on one end with an ohmmeter on the Rx1 scale.

   R1+Rs =_____
5. Measure the resistance from the other end.

   R2+Rs =_____
6. Add the measurements of 4) and 5) above, subtract the measurement of 2), and divide the result by 2.

   Rs =_____
7. Subtract the value of 6) from the measured values of 4) and 5).

   R1 =_____

   R2 =_____
8. The distance to the short from end #1 is the ratio of (R1/R1+R2) times the total cable length. Recheck from end #2 which is (R2/R1+R2) times the cable length.

Open Wire

An open wire in a cable is much more difficult to locate than a short circuit; therefore, a capacitance bridge is recommended. Measuring the capacitance from the open wire to the shield on both ends allows two different capacitance readings to be recorded. This represents a direct ratio related to cable length and distance of break from each end. Before cutting the cable, double-check the same ratio of capacitance using an adjacent good wire in a multi-conductor cable. Capacitance may vary from wire to wire, depending on their separation.

Most breaks occur around the tow cable termination or where a previous repair has been made. A cable break may be found or confirmed by laying out the cable and attaching an ohmmeter across each end of the open wire. Then flex the cable first near the termination or repaired section and then along its entire length until the break is reached. When flexing, the ends of the broken wire may touch, giving a continuity reading on the meter.

Insulation Resistance Breakdown

Insulation breakdown is the most difficult fault to locate. Cable leakage is not necessarily located near the end terminations. However, the area near each termination receives the most abuse and is, therefore, subject to suspicion. Successive cutting of the cable end until leakage disappears will prove successful in many cases.

CAUTION!

Prior to cutting the cable for any of the above reasons, a careful visual examination should be made for any signs of physical damage.

With both ends disconnected, the tow cables should measure between 100 Mega-ohms and infinity between conductors with a 500 VDC Meg ohmmeter. When using a Simpson 260 Multi-meter, all cables wire-to-wire or wire-to-shield should measure infinity. Any leakage on the multi-meter indicates cable leakage.

Damaged Tow cable Connector

The towfish has a trip line that prevents the vehicle from hanging up on a snag. When the line trips, the cable connection to the fish disconnects exposing the high voltage pins to seawater. Pin corrosion will start to occur as long as power is still applied. If the power is not immediately removed, and the cable is not immediately retrieved and the connector flushed out with fresh water, there may be permanent damage to the connector. This will require cable re-termination.

5.10 Part Numbers for Major Topside Processor Components

The major topside processor components and their part numbers are listed in Table 5-4.

Table 5-4: Part Numbers for Major Topside Processor Components

DESCRIPTION, PART NUMBER	RACK MOUNT	701-DL	PORTABLE
CPU, 191043	X		
160GB HDD, 191140	X		
1TB HDD, 206547	X		
MODEM, 040-0000050-1000	X	X	X
NETBURNER MODULE, 040-NETBURN-1000	X	X	X
INDUCTOR, B962377	X	X	X
POWER SUPPLY,24VDC, 190764	X	X	X
ETHERNET WIRELESS BRIDGE, 194085			X
ASSY, PCB, POWER BD, 200-0000101-1000	X	X	X

5.11 Part Numbers for Major Tow Vehicle Components

The major tow vehicle components and their part numbers are listed in Table 5-5.

Table 5-5: Part Numbers for Major Tow Vehicle Components

DESCRIPTION, PART NUMBER	2000m	500m	100/400	300/600	300/900
COMPASS MODULE, 207411			X	X	X
MEM,FLSH,512MB 040-0000085-1001			X	X	X
PICO CPU, 040-PICOITX-1000			X	X	X
ASSY AMP,BD 200-0000040-1000			X	X	X
T/R BD, 200-0000052-1000			X		
T/R BD, 200-0000306-1000				X	
T/R BD, 200-0000312-1000					X
SSAC BD, 200-0000073-1000			X		
DDC BD, 200-0000358-1000				X	X
SONAR/IDE BD, 200-0000087-1000			X	X	X
DSL MODEM 200-0000094-100			X	X	X
POWER DIST BD, 200-0000096-1000,			X	X	X
SHEAR PIN 5/16” 350-0000303-0300	X				
SHEAR PIN ¼” 350-0000545-0300		X			
100/400 RX XDUCER B980789			X		
100/400 TX XDUCER B980790			X		
300/600 RX XDUCER C980831				X	
300/600 TX XDUCER C980832				X	
300/900 TX XDUCER C981248					X
300/900 RX XDUCER C981249					X
TAIL FIN, 350-0000742-0300	X				
TAIL FIN, 350-0000599-0300		X			

APPENDIX A: Printer Connections

A number of different printers are available for connecting to the 4200 Series High Definition Dual Frequency Side Scan Sonar System. All of these printers connect to the PARALLEL connector on the back of the 4200 Rack Mount Topside Processor, to a USB connector of the laptop computer for the 4200-P Portable Topside Processor, or to a USB connector of the user supplied computer for the 701-DL Digital Link.

Of the available printers, the following are recommended for best results:

- Ultra 120 (and HD version)
- Ultra 200 (and HD version)
- EPC HSP 100
- EPC 1086-NT
- EPC 1086
- EPC 1086 (early models)
- EPC 9206
- TDU-850
- Sys V8.5
- GeoPrinter 975

Of the available printers, the following are recommended for best results:

- EPC Model 1086
- EPC Model HSP-100
- Raytheon Model TDU-850

Listed in Table A-1 are the required settings to properly interface a printer with the 4200 Series High Definition Dual Frequency Side Scan Sonar System.

Table A-1: Printer Requirements

Trigger:	Internal
Data input:	Parallel
Sweep:	Forward
LPI:	200
Width:	2048
Data type:	6 bits
Shades:	64
Image:	Positive
Contrast:	40%

A.1 EPC Model 1086

The EPC Model GSP-1086 is a gray scale continuous printer that is widely used in the marine industry. It provides high quality images on a ten-inch thermal printhead. The general specifications for the Model 1086 printer are listed in Table A-2.

Table A-2: EPC Model 1086 General Specifications

Paper:	Thermal or plastic
Data pixels:	2048
Paper length:	45.7 m (150 ft)
Film length:	39.6 m (130 ft)
Paper/film width:	26.6 cm (10.48 in.)
Resolution:	8 dots/mm (203 dots/in.)
Tone shades:	Up to 256 gray scale
Interface:	8 bit parallel
Plot speed:	43 ms per line @ 64 shades

A.2 EPC Model HSP-100

The EPC Model HSP-100 is a fast, high resolution, low cost thermal printer. The general specifications for the Model HSP-100 printer are listed in Table A-3.

Table A-3: EPC Model HSP-100 General Specifications

Paper:	Thermal or plastic
Data pixels:	2048
Paper length:	45.7 m (150 ft)
Film length:	39.6 m (130 ft)
Paper/film width:	25.6 cm (10.0 in.)
Resolution:	8 dots/mm (203 dots/in.)
Tone shades:	Up to 256 gray scale
Interface:	8 bit parallel
Plot speed:	10 ms per line maximum

A.3 Raytheon Model TDU-850

The Raytheon Model TDU-850 printer is a high speed gray shade printer that uses a fixed thermal head to produce a hard copy image on direct recording thermal paper. The general specifications for the Model TDU-850 printer are listed in Table A-4.

Table A-4: Raytheon Model TDU-850 General Specifications

Paper width:	22.2 cm (8.75 in.)
Active scan length:	21.6 cm (8.5 in.)
Paper roll length:	61 m (165 ft)
Resolution:	8 dots/mm (203 dots/in.)
Contrast:	23 dB minimum dynamic range
Sweep speed:	256 gray shades at 40 ms/line
Plot speed:	10 ms per line maximum

APPENDIX B: System Backup and Restore

A Norton Ghost CD is included with the 4200 Rack Mount and 4200-P Portable Topside Processors. The software on this CD is also preinstalled on the operating system hard drive of these systems and includes the Norton Ghost Drive Backup Wizard which is used to create a backup image of the hard drive onto one or more DVDs, and the Norton Ghost Restore Wizard which is used to restore the backup image from the DVDs onto an existing or replacement hard drive. The Restore Drive Wizard uses the Symantec Recovery Disk which is run from the bootable Norton Ghost CD. A minimum of 256 MB of RAM to is required, and the drive letters may differ from those of Windows XP.

B.1 Backing up the System Drive

To back up the system drive:

1. Exit all running software applications.
2. Choose Start/Programs/Norton Ghost/Norton Ghost.

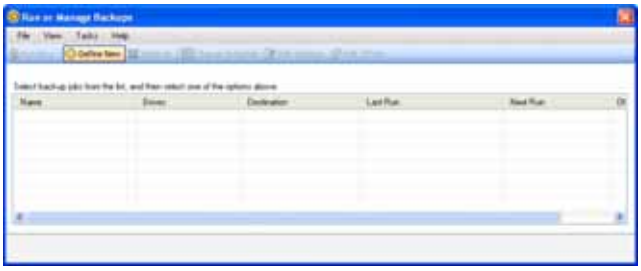
   The Norton Ghost Main window opens to the Home tab:

3. Click Run or Manage Backups.

   The Easy Setup dialog box opens.

4. Click Cancel in the Easy Setup dialog box.

   The Run or Manage Backups window opens:

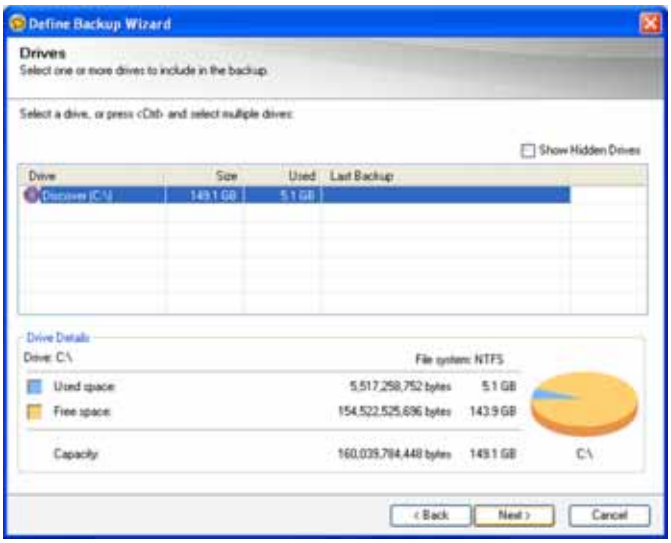


5. Click the Define New tab.

   The Define Backup Wizard window opens to the Welcome to the Define Backup Wizard screen:

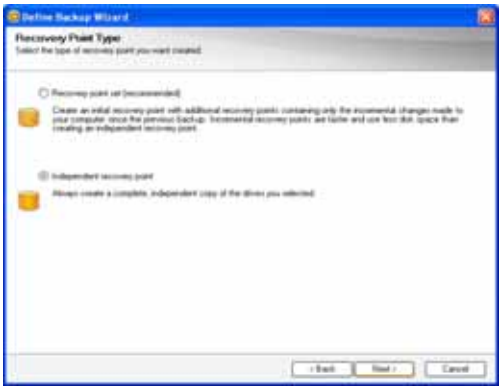
6. Choose the Back up my computer option, and then click Next.

   The Drives screen opens:



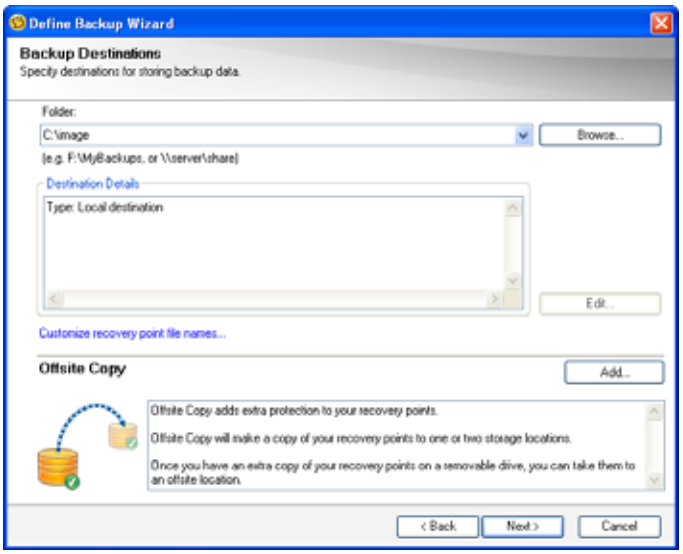
7. Select the Discover [C:\] drive, and then click Next.

The Recovery Point Type screen opens:



8. Choose the Independent recovery point option, and then click Next.

The Backup Destinations screen opens:


Define Backup Wizard
Backup Destinations
Specify destinations for storing backup data.
Folder:
C:\image
Browse...
(e.g. F:\MyBackups, or \\server\share)
Destination Details
Type: Local destination
Edit...
Customize recovery point file names...
Offsite Copy
Add...
Offsite Copy adds extra protection to your recovery points.
Offsite Copy will make a copy of your recovery points to one or two storage locations.
Once you have an extra copy of your recovery points on a removable drive, you can take them to an offsite location.
< Back
Next >
Cancel

9. In the Backup Destinations screen, click Browse and create the folder C:\image.
10. Click Next, and then click Yes in the Define Backup Wizard note.

    The Options screen opens:

11. Enter image of Discover (C:\) in the Name text box.
12. Select Standard from the Compression drop-down list box.

NOTE: **A compression selection of None will reduce the backup/restore time but increase the file size. The default compression selection of Standard is slower but the file size is smaller. The Standard selection is usually a good compromise.**

13. Select the Verify recovery point after creation check box.

14. Clear the Limit the number of recovery points saved for this backup check box.

15. Click Next.

The Backup Time screen opens:

16. Click Next.

17. The Completing the Define Backup Wizard screen opens:

18. Verify the following:
    - Drives and backup destinations is Discover (C:\) to C:\image\C_Drive.v2i.
    - Scheduled backup time is No schedule.
19. Verify the following options:
    - Backup name is image of Discover (C:\).
    - Compression Level is Standard.
20. Select the Prepend computer name to backup data file names option.
21. Verify that all the other options, including all the advanced options are not selected.
22. Select the Run backup now check box.
23. Click Finish to begin creating the backup image.

NOTE: **The entire backup process may take one or more hours to complete, depending on the size of backup image. During the backup process, the Drive Backup Wizard may require that you insert additional DVDs if the image file requires more storage that is available on a single DVD. It may also require that you reinsert the DVDs for verification.**

The backup process starts and the Progress and Performance window opens:

When the backup image is created, a confirmation is displayed:

24. Click Close.
25. Insert a blank DVD into the DVD drive.

> ***NOTE:*** **Some software programs may start automatically when detecting a blank DVD. Always exit these programs, and if prompted, select an option to prevent these programs from starting or taking any automatic action when detecting the DVD.**

26. Burn the image files [C_Drive.v2i, Symantec Image file and *.sv2i, Symantec Recovery Disk file] onto the DVD.
27. Remove the DVD and store it in a safe place.

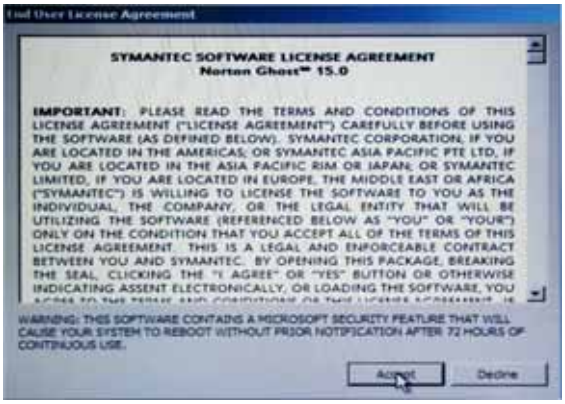
B.2 Restoring the System Drive

If the backup image will be restored onto a new hard drive, be sure to install the drive as the Primary IDE Master before proceeding with the restore procedure.

To restore the system drive:

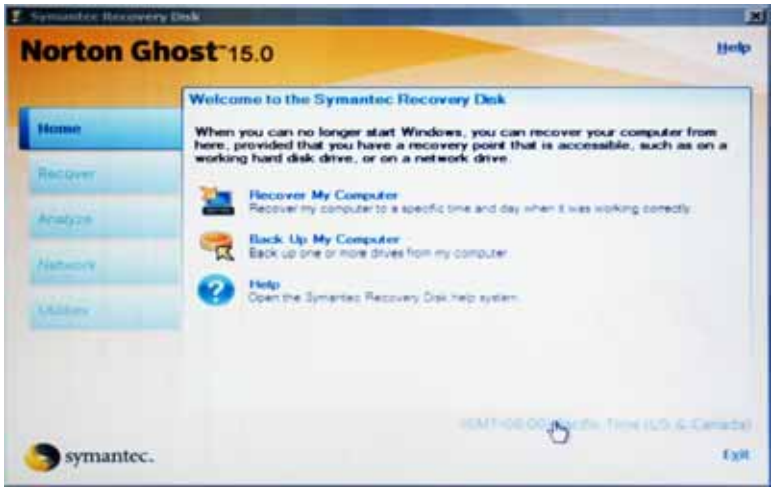
1. Insert the Norton Ghost CD into the DVD drive.
2. Restart the computer and watch the monitor screen carefully.
3. If the prompt "Press any key to boot from CD" appears, do so within 5 seconds.

   The computer will boot from the Symantec Recovery Disk on the Norton Ghost CD. This process will take several minutes to complete, during which a progress bar is displayed. After boot-up is complete, the End User License Agreement window opens:


End User License Agreement
SYMANTEC SOFTWARE LICENSE AGREEMENT
Norton Ghost™ 15.0
IMPORTANT: PLEASE READ THE TERMS AND CONDITIONS OF THIS LICENSE AGREEMENT ("LICENSE AGREEMENT") CAREFULLY BEFORE USING THE SOFTWARE (AS DEFINED BELOW). SYMANTEC CORPORATION, IF YOU ARE LOCATED IN THE AMERICAS; OR SYMANTEC ASIA PACIFIC PTE LTD, IF YOU ARE LOCATED IN THE ASIA PACIFIC RIM OR JAPAN; OR SYMANTEC LIMITED, IF YOU ARE LOCATED IN EUROPE, THE MIDDLE EAST OR AFRICA ("SYMANTEC") IS WILLING TO LICENSE THE SOFTWARE TO YOU AS THE INDIVIDUAL, THE COMPANY, OR THE LEGAL ENTITY THAT WILL BE UTILIZING THE SOFTWARE (REFERENCED BELOW AS "YOU" OR "YOUR") ONLY ON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS OF THIS LICENSE AGREEMENT. THIS IS A LEGAL AND ENFORCEABLE CONTRACT BETWEEN YOU AND SYMANTEC. BY OPENING THIS PACKAGE, BREAKING THE SEAL, CLICKING THE "I AGREE" OR "YES" BUTTON OR OTHERWISE INDICATING ASSENT ELECTRONICALLY, OR LOADING THE SOFTWARE, YOU
WARNING: THIS SOFTWARE CONTAINS A MICROSOFT SECURITY FEATURE THAT WILL CAUSE YOUR SYSTEM TO REBOOT WITHOUT PRIOR NOTIFICATION AFTER 72 HOURS OF CONTINUOUS USE.
Accept
Decline

4. Click Accept.

The Symantec Recovery Disk main window opens to the Welcome to the Symantec Recovery Disk screen:


Norton Ghost™ 15.0
Help
Welcome to the Symantec Recovery Disk
Home
When you can no longer start Windows, you can recover your computer from here, provided that you have a recovery point that is accessible, such as on a working hard disk drive, or on a network drive.
Recover My Computer
Back Up My Computer
Help
symantec.
Exit

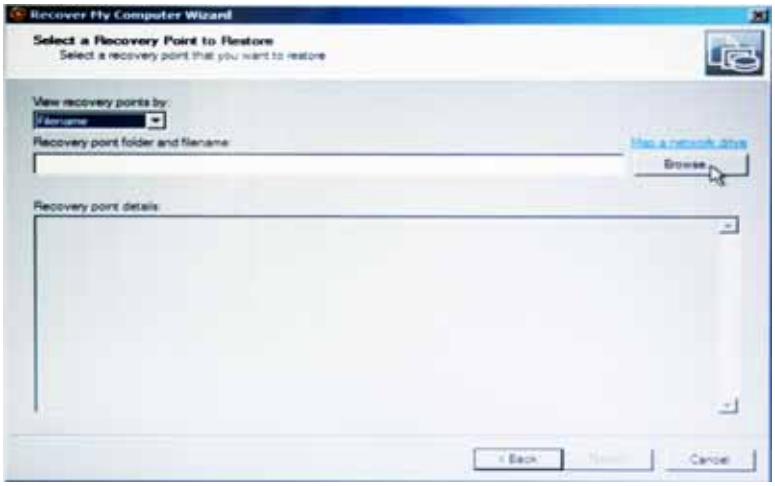
5. Click the Time Zone field in the lower right corner of the screen, and then in the Time Zone drop-down list box, choose the time zone for your area.

6. In the Welcome to the Symantec Recovery Disk screen, select Recover My Computer.

The Recover My Computer Wizard window opens to the Welcome to the Recover My Computer Wizard screen:

7. Click Next.
8. Click OK in the Recover My Computer Wizard note to acknowledge browsing to a location that contains recovery points.

   The Select a Recovery Point to Restore screen opens:

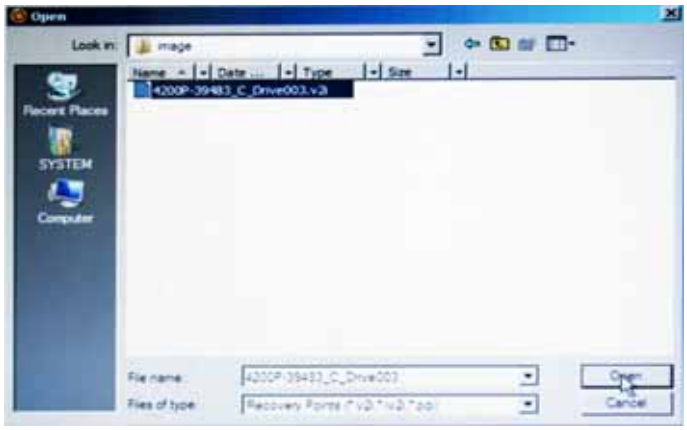

Recover My Computer Wizard
Select a Recovery Point to Restore
Select a recovery point that you want to restore
View recovery points by:
Recovery point folder and filename:
Browse...
Recovery point details:
Cancel

9. Remove the Norton Ghost CD from the DVD drive.
10. Insert the DVD with the image file into the DVD drive. If the image file spans more than one DVD, insert Disk 1 of the series. Wait until the DVD is read before proceeding.
11. Click Browse, go to the Desktop, and then click Computer.

    The Computer folder opens:

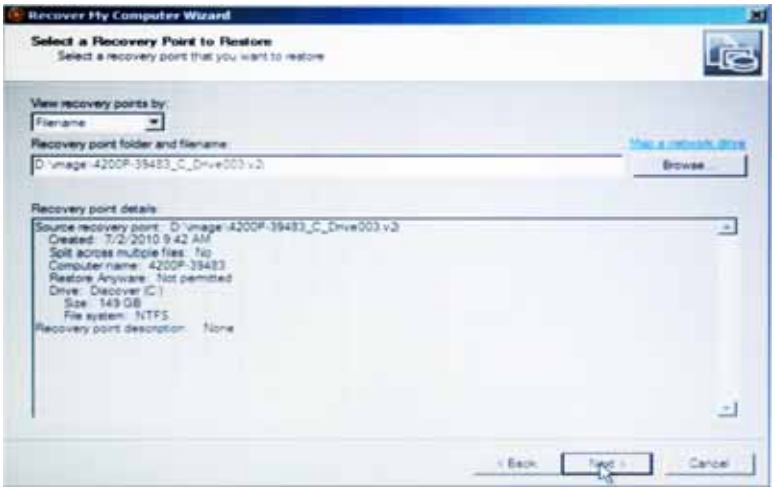
12. Click the DVD drive, and then click Open.

The image file opens:



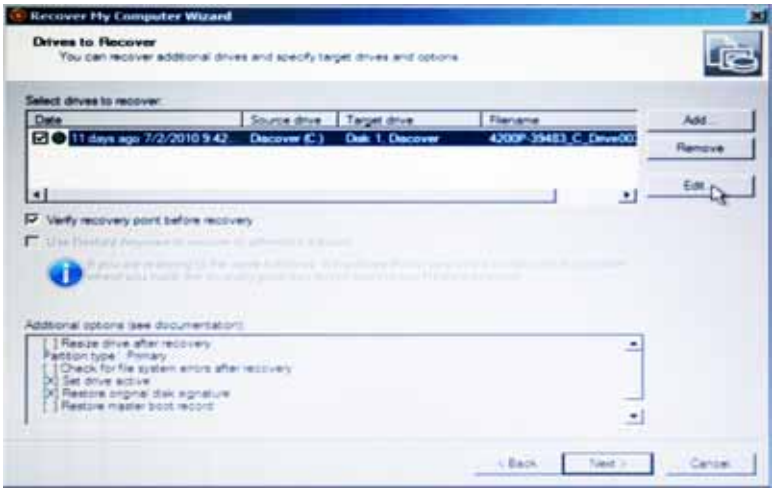
13. Select the image file, and then click Open.

The recovery point details are displayed in the Select a Recovery Point to restore screen:



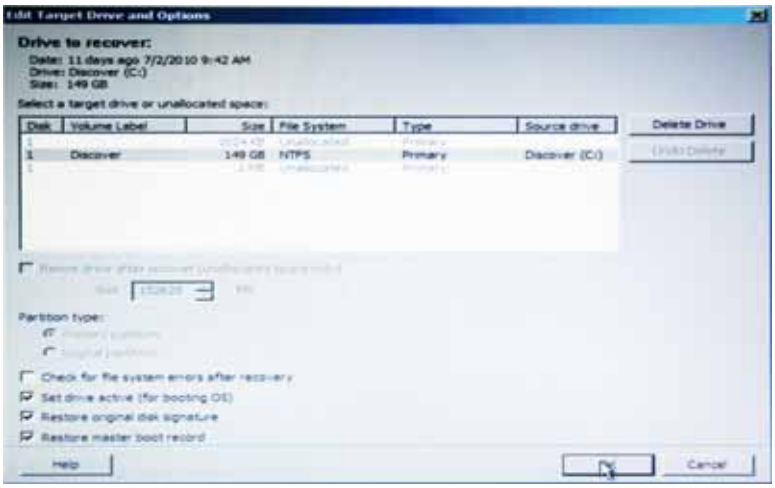
14. Verify the recovery point details, and then click Next.

The Drives to Recover screen opens:



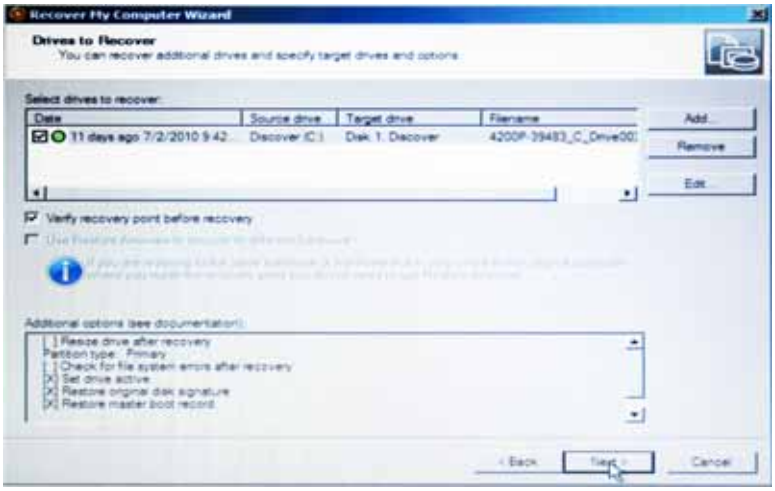
15. Select the drive to recover, and then Click Edit.

The Edit Target Drive and Options window opens:



16. Select the Restore master boot record check box, and then click OK.

17. Verify that the option Restore master boot record is selected in the Drives to Recover Screen:



18. Click Next.

The Completing the Recover My Computer Wizard screen opens:

19. Click Finish.

NOTE: **Restoring the backup image can take one or more hours to complete, depending on its size. If the backup image spans more than one DVD, the Restore Drive Wizard will require that you insert the additional DVDs.**

20. When the restore is complete, remove the DVD from the DVD drive and restart the computer.

APPENDIX C: Configuring the ADSL Modems

Configuration of the ADSL modems in the topside processor and in the tow vehicle is for advanced users only. The ADSL modem in the topside processor is a Zoom ADSL X3 Modem Model 5560, and in the tow vehicle, a Zoom ADSL X5 Modem Model 5654. The Model 5560 is a combination modem, router and Ethernet port. The Model 5654 is a combination modem, router and 4-port switch.

> ***NOTE:*** **Both the X3 and X5 ADSL Modems should be reset to their default manufacturer's configuration before making any configuration changes. To reset the modems, first turn them on and then press the RESET button on the back of the device for at least 10 seconds.**

C.1 Advanced Users Setup Guides

The following setup guides for the Zoom ADSL X3 Modem Models 5560A, 5560 and 5654 are for advanced users only.

C.1.1 Zoom ADSL X3 Modem Model 5560A Setup

To set up the Zoom ADSL X3 Modem Model 5560A:

1. Open your web browser and enter http://10.0.0.2 or http://192.9.0.22 to connect to the modem.
2. Login with username = admin and password = zoomadsl.
3. From the Basic Setup page, choose the MANUALLY option to configure the modem.
4. From the Advanced Setup page, click WAN Settings, make the following WAN configuration changes, and then click Save Changes:

   Encapsulation = 1483 Bridged IP LLC
   VPI = 0
   VCI = 35
   Bridge = Enabled

5. From the Advanced Setup page, click LAN Settings, make the following LAN configuration changes, and then click Save Changes:

   Conf. LAN IP Address = 192.9.0.22
   Conf. LAN Network Mask = 255.255.255.0

6. Open a web page to http://192.9.0.22 and log in as user = admin, password = zoomadsl.
7. From the Basic Setup page, click Write Settings to Flash to permanently save the modem settings.
8. Open a telnet session to http://192.9.0.22.
9. Login with username = admin and password = zoomadsl.
10. Enter the following sequence of commands. Wait for a “Set Done” response between commands.

$modify dsl config autosensegdmtfirst	Response: "Set Done"
$modify dsl config bitswap enable	Response: "Set Done"
$commit	Response: "Set Done"
$get dsl config	Response: config listing
$exit	Response: none, telnet disconnects

The captured telnet session is the following:

```
$modify dsl config autosensegdmtfirst

Set Done

$modify dsl config bitswap enable

Set Done

$commit

Set Done

$get dsl config

Whip              : Disable               Annex Type          : Annex A
Standard          : Autosense GDMT first  Trellis coding      : Enable
ExpExchSeq        : Expanded              Framing structure   : Framing-3
TxAttenuation(dB) : 0                     Coding Gain         : Auto
TxBinAdjust       : Enable                RxBinAdjust         : Disable
TxStartBin        : 6                     TxEndBin            : 31
RxStartBin        : 32                    RxEndBin            : 255
Fast Retrain      : Disable               Esc Fast Retrain    : Disable
MaxBits/bin On Rx : 14                    Bit Swap            : Enable
Dual Latency      : Enable                Pmode               : Enable
Pilot Request     : Enable                Last Failed Status  : 0x0
Oper Status       : Showtime/Data         Startup Progress    : 0xad
AC Mode item      : dbm                   AC Ttr R Offset     : 42
AC Pilot Request  : Disable               EC Fdm Mode         : FDM
Max Down Rate     : 0xff

$exit
```

C.1.2 Zoom ADSL X3 Modem Model 5560 Setup

To set up the Zoom ADSL X3 Modem Model 5560:

1. Open your web browser and enter http://10.0.0.2 or http://192.9.0.22 to connect to the modem.
2. Login with username = admin and password = zoomadsl.
3. From the Basic Setup page, choose the MANUALLY option to configure the modem.
4. From the Advanced Setup page, click ADSL Configuration, make the following ADSL configuration changes, and then click Save Changes:

   Bit Swapping = Enabled
5. From the Advanced Setup page, click WAN Settings, make the following WAN configuration changes, and then click Save Changes:

   Encapsulation = 1483 Bridged IP LLC
   Bridge = Enabled
6. From the Advanced Setup page, click LAN, make the following LAN configuration changes, and then click Save Changes:

   IP Address = 192.9.0.22
   Subnet Mask = 255.255.255.0
7. From the Advanced Setup page, click Misc. Configuration, make the following miscellaneous configuration changes, and then click Save Changes:

   Command Line Interface = Enabled
8. Open a web page to http://192.9.0.22 and log in as user = admin, password = zoomadsl.
9. From the Basic Setup page, click Write Settings to Flash to permanently save the modem settings.

C.1.3 Zoom ADSL X5 Modem Model 5564 Setup

To set up the Zoom ADSL X5 Modem Model 5564:

1. Open your web browser and enter http://10.0.0.2 or http://192.9.0.22 to connect to the modem.
2. Login with username = admin and password = zoomadsl.

3. From the Basic Setup page, choose the MANUALLY option to configure the modem.
4. From the Advanced Setup page, click WAN Settings, make the following WAN configuration changes, and then click Save Changes:

   Encapsulation = 1483 Bridged IP LLC
   VPI = 0
   VCI = 35
   Bridge = Enabled

5. From the Advanced Setup page, click LAN Settings, make the following LAN configuration changes, and then click Save Changes:

   Conf. LAN IP Address = 192.9.0.22
   Conf. LAN Network Mask = 255.255.255.0

6. Open a web page to http://192.9.0.22 and log in as user = admin, password = zoomadsl
7. From the Basic Setup page, click Write Settings to Flash to permanently save the modem settings.
8. Open a telnet session to http://192.9.0.22.
9. Login with username = admin and password = zoomadsl.
10. Enter the following sequence of commands, wait for a “Set Done” response between commands.

$modify dsl config defaultsgdmt	Response: "Set Done"
$modify dsl config bitswap enable	Response: "Set Done"
$commit	Response: "Set Done"
$get dsl config	Response: config listing
$exit	Response: none, telnet disconnects

The captured telnet session is the following:

```
$modify dsl config defaultsgdmt

Set Done

$modify dsl config bitswap enable

Set Done

$commit

Set Done

$get dsl config

Whip                : Disable              Trellis coding      : Disable
Conn Standard       : -                    Max Down Rate       : 0xff
ExpExchSeq          : Expanded             Framing structure   : Framing-3
TxAttenuation(dB)   : 0                    Coding Gain         : Auto
TxBinAdjust         : Disable              RxBinAdjust         : Disable
TxStartBin          : 6                    TxEndBin            : 31
RxStartBin          : 32                   RxEndBin            : 255
Fast Retrain        : Enable               Esc Fast Retrain    : Disable
MaxBits/bin On Rx   : 15                   Bit Swap            : Enable
Dual Latency        : Disable              Pmode               : Enable
Pilot Request       : Enable               Last Failed Status  : 0x0
Oper Status         : Startup HShake       Startup Progress    : 0xa0
AC Mode item        : fbm                  AC Ttr R Offset     : 0
AC Pilot Request    : Enable               EC Fdm Mode         : FDM
Pwr Mgmt Mode       : L2L3NotAllwd         Profile             : Main
Adv Capability      : Annex A
UpstreamBitswap     : Enable               Memory Mode         : Disabled
UpStreamLatency     : -                    DownStreamLatency   : -
MaxSNR Margin       : Disabled             SRA                 : Disabled
Defaults            : G.dmt                Logging             : Disabled

$_
$exit
```

C.2 Detailed Zoom Modem Setup Guide

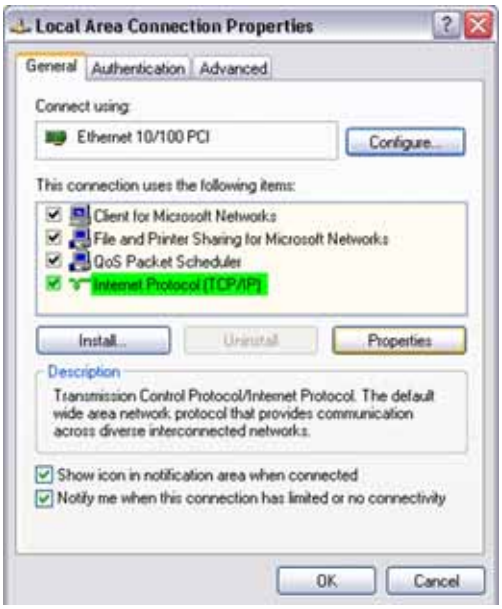
The following setup guides for the Zoom ADSL X3 Modem Models 5560A, 5560 and 5654 are provided in detail.

C.2.1 Adding a Temporary Host IP Address

To add a temporary host IP address:

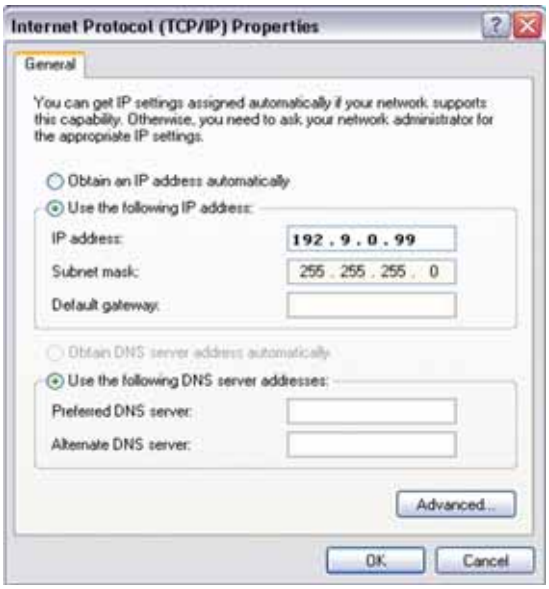
1. From the Control Panel select Network and Internet Connections and then choose Network Connections.
2. Right-click Local Area Connection, and then choose Properties.

   The Local Area Connection Properties dialog box opens:



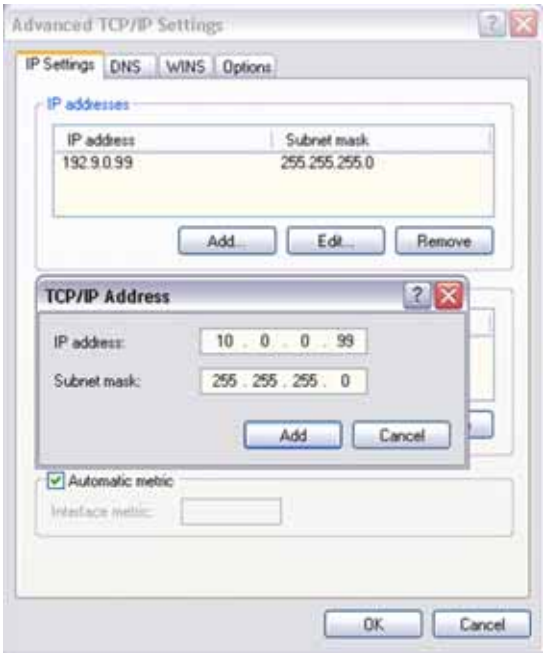
3. Select Internet Protocol (TCP/IP), and then click Properties.

4. The Internet Protocol (TCP/IP) Properties dialog box opens:


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 9 . 0 . 99
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

5. Click Advanced.

The Advanced TCP/IP dialog box opens which lists all of the existing IP addresses:



6. Do one of the following:

- If an IP Address = 10.0.0.2 is listed, the subnet for 10.0.0.x already exists but the IP Address conflicts with that of the modem. Change the IP Address by selecting it and clicking Edit to open it in the TCP/IP Address window, and then edit the IP Address in the TCP/IP Address window by entering

  IP Address = 10.0.0.99
  Subnet Mask = 255.255.255.0

  and then clicking OK until done.

- If another IP Address in the range 10.0.0.x is listed, the subnet for 10.0.0.x already exists and no further action is required to add the subnet. Skip the remaining steps in this section by clicking Cancel until done.

- If no IP Address in the range 10.0.0.x is listed, click Add to open the TCP/IP Address window, then add the new subnet in the TCP/IP Address window by entering

  IP Address = 10.0.0.99
  Subnet Mask = 255.255.255.0

  and then clicking Add followed by clicking OK until done.

C.2.2 Zoom X3 and X5 ADSL Modem Models 5560A and 5654 Setup—HTML Accessible Configuration

To set up the Zoom X3 and X5 ADSL Modem Models 5560A and 5654—HTML accessible configuration:

1. Open your web browser and enter http://10.0.0.2 or http://192.9.0.22 to connect to the modem.
2. Login with username = admin and password = zoomadsl.

   The Basic Setup page opens:

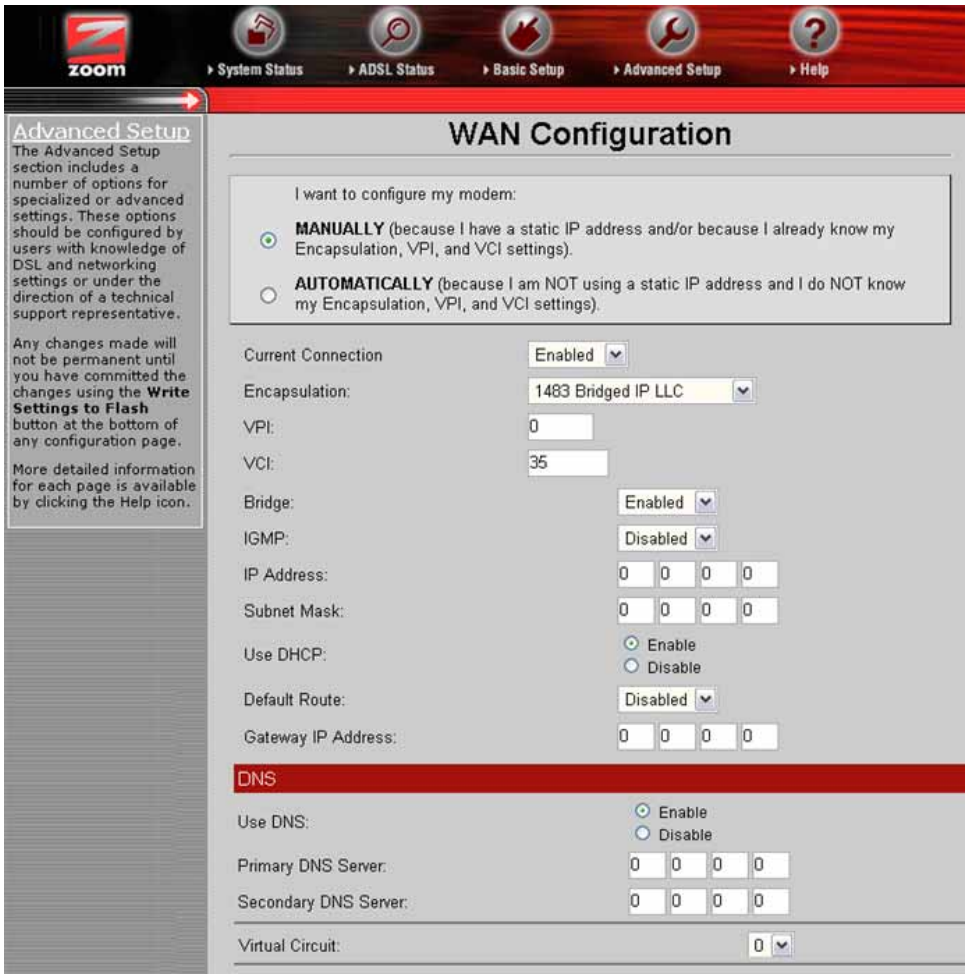
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Basic Setup
This page contains the settings needed to establish a connection to your service provider. More detailed information for each setting is available by clicking the Help icon.
Important: If you make changes to this page, you must click the Save Changes button to make the changes active and then the Write Settings to Flash button to make them permanent. If you
Basic Setup
I want to configure my modem:
MANUALLY (because I have a static IP address and/or because I already know my Encapsulation, VPI, and VCI settings).
AUTOMATICALLY (because I am NOT using a static IP address and I do NOT know my Encapsulation, VPI, and VCI settings).

3. Choose the MANUALLY option to configure the modem.
4. Click Advanced Setup.

   The Advanced Setup page opens:

5. Click WAN Settings.

The WAN Configuration page opens:


zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Advanced Setup
The Advanced Setup section includes a number of options for specialized or advanced settings. These options should be configured by users with knowledge of DSL and networking settings or under the direction of a technical support representative.
Any changes made will not be permanent until you have committed the changes using the Write Settings to Flash button at the bottom of any configuration page.
More detailed information for each page is available by clicking the Help icon.
WAN Configuration
I want to configure my modem:
MANUALLY (because I have a static IP address and/or because I already know my Encapsulation, VPI, and VCI settings).
AUTOMATICALLY (because I am NOT using a static IP address and I do NOT know my Encapsulation, VPI, and VCI settings).
Current Connection
Enabled
Encapsulation:
1483 Bridged IP LLC
VPI:
0
VCI:
35
Bridge:
Enabled
IGMP:
Disabled
IP Address:
Subnet Mask:
Use DHCP:
Enable
Disable
Default Route:
Disabled
Gateway IP Address:
DNS
Use DNS:
Enable
Disable
Primary DNS Server:
Secondary DNS Server:
Virtual Circuit:

6. Make the following WAN configuration changes:

Encapsulation = 1483 Bridged IP LLC
VPI = 0
VCI = 35
Bridge = Enabled

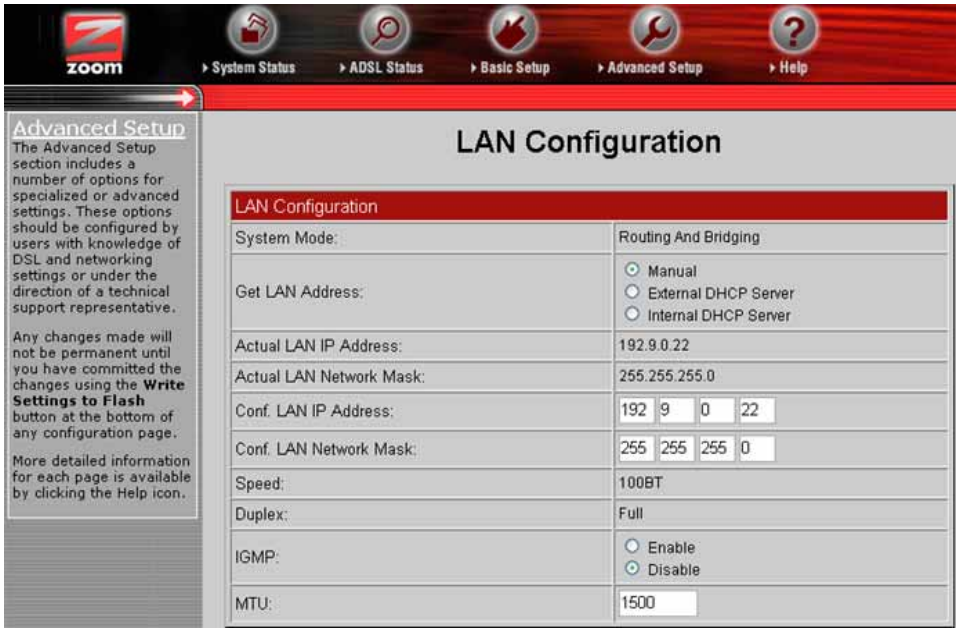
7. Click Save Changes.

8. Click Advanced Setup.

   The Advance Setup page opens.

9. Click LAN Settings.

   The LAN Configuration page opens:


zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Advanced Setup
The Advanced Setup section includes a number of options for specialized or advanced settings. These options should be configured by users with knowledge of DSL and networking settings or under the direction of a technical support representative.
Any changes made will not be permanent until you have committed the changes using the Write Settings to Flash button at the bottom of any configuration page.
More detailed information for each page is available by clicking the Help icon.
LAN Configuration
LAN Configuration
System Mode: Routing And Bridging
Get LAN Address: Manual / External DHCP Server / Internal DHCP Server
Actual LAN IP Address: 192.9.0.22
Actual LAN Network Mask: 255.255.255.0
Conf. LAN IP Address: 192 9 0 22
Conf. LAN Network Mask: 255 255 255 0
Speed: 100BT
Duplex: Full
IGMP: Enable / Disable
MTU: 1500

10. Make the following LAN Configuration changes:

    Conf. LAN IP Address = 192.9.0.22
    Conf. LAN Network Mask = 255.255.255.0

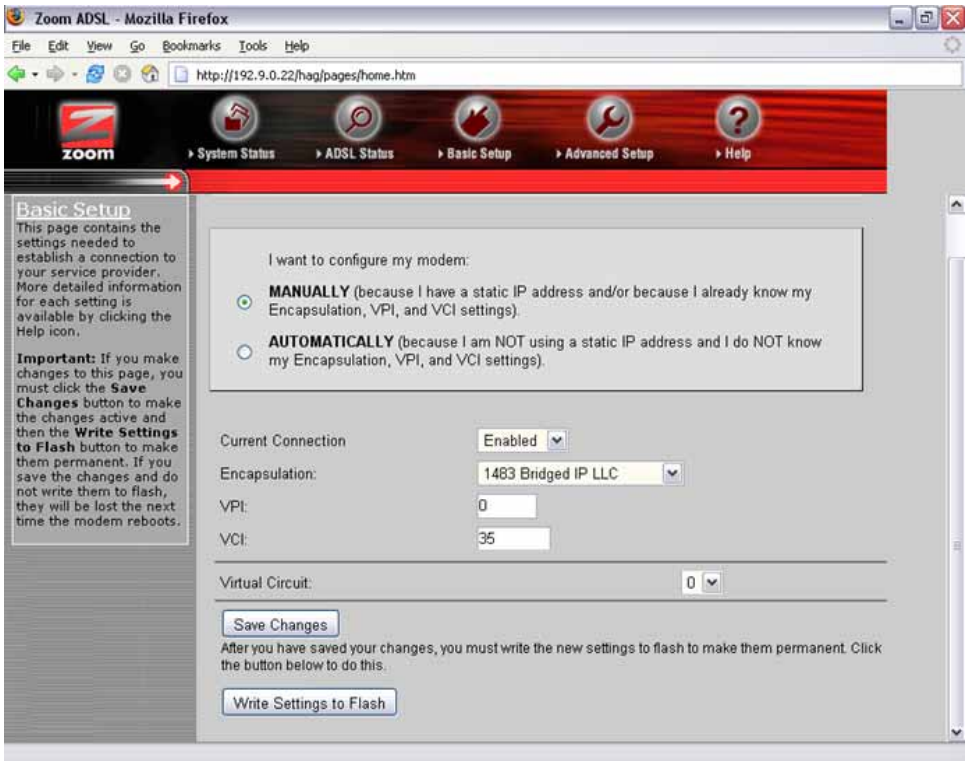
11. Click Save Changes.

12. Close the web browser.

13. Open a new web browser and enter the new address http://192.9.0.22 to connect to the modem.

14. Login with username = admin and password = zoomadsl.

    The Basic Setup page opens:


Zoom ADSL - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://192.9.0.22/hag/pages/home.htm
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Basic Setup
This page contains the settings needed to establish a connection to your service provider. More detailed information for each setting is available by clicking the Help icon.
Important: If you make changes to this page, you must click the Save Changes button to make the changes active and then the Write Settings to Flash button to make them permanent. If you save the changes and do not write them to flash, they will be lost the next time the modem reboots.
I want to configure my modem:
MANUALLY (because I have a static IP address and/or because I already know my Encapsulation, VPI, and VCI settings).
AUTOMATICALLY (because I am NOT using a static IP address and I do NOT know my Encapsulation, VPI, and VCI settings).
Current Connection
Enabled
Encapsulation:
1483 Bridged IP LLC
VPI:
0
VCI:
35
Virtual Circuit:
0
Save Changes
After you have saved your changes, you must write the new settings to flash to make them permanent. Click the button below to do this.
Write Settings to Flash

15. Click Write Settings to Flash to permanently save the changed settings.

C.2.3 Zoom X3 ADSL Modem Model 5560A Setup—Telnet-only Accessible Configuration

To set up the Zoom X3 ADSL Modem Model 5560A —telnet-only accessible configuration:

1. Open a Windows Command Shell by choosing Run from the Start menu, entering "cmd" in the Open text box and clicking OK.
2. In Windows Command Shell enter "telnet 192.9.0.22," and then press Enter.
3. If the telnet connection succeeds, the Zoom modem displays a "$" prompt.
4. Login with username = admin and password = zoomadsl.

5. Enter the following sequence of commands. Wait for a “Set Done” response between commands.

$modify dsl config autosensegdmtfirst	Response: "Set Done"
$modify dsl config bitswap enable	Response: "Set Done"
$commit	Response: "Set Done"
$get dsl config	Response: config listing
$exit	Response: none, telnet disconnects

The captured telnet session is the following:

```
$modify dsl config autosensegdmtfirst

Set Done

$modify dsl config bitswap enable

Set Done

$commit

Set Done

$get dsl config

Whip              : Disable               Annex Type          : Annex A
Standard          : Autosense GDMT first  Trellis coding      : Enable
ExpExchSeq        : Expanded              Framing structure   : Framing-3
TxAttenuation(dB) : 0                     Coding Gain         : Auto
TxBinAdjust       : Enable                RxBinAdjust         : Disable
TxStartBin        : 6                     TxEndBin            : 31
RxStartBin        : 32                    RxEndBin            : 255
Fast Retrain      : Disable               Esc Fast Retrain    : Disable
MaxBits/bin On Rx : 14                    Bit Swap            : Enable
Dual Latency      : Enable                Pmode               : Enable
Pilot Request     : Enable                Last Failed Status  : 0x0
Oper Status       : Showtime/Data         Startup Progress    : 0xad
AC Mode item      : dbm                   AC Ttr R Offset     : 42
AC Pilot Request  : Disable               EC Fdm Mode         : FDM
Max Down Rate     : 0xff

$exit
```

After these settings have been saved to flash memory, the modem configuration ins complete.

C.2.4 Zoom X5 ADSL Modem Model 5654 Setup—Telnet-Only Accessible Configuration

To set up the Zoom X5 ADSL Modem Model 5654—telnet-only accessible configuration:

1. Open a Windows Command Shell by choosing Run from the Start menu, entering "cmd" in the Open text box and clicking OK.

2. In Windows Command Shell enter "telnet 192.9.0.22," and then press Enter.
3. If the telnet connection succeeds, the Zoom modem displays a "$" prompt.
4. Login with username = admin and password = zoomadsl.
5. Enter the following sequence of commands, wait for a “Set Done” response between commands.

$modify dsl config defaultsgdmt	Response: "Set Done"
$modify dsl config bitswap enable	Response: "Set Done"
$commit	Response: "Set Done"
$get dsl config	Response: config listing
$exit	Response: none, telnet disconnects

The captured telnet session is the following:

```
$modify dsl config defaultsgdmt

Set Done

$modify dsl config bitswap enable

Set Done

$commit

Set Done

$get dsl config

Whip               : Disable              Trellis coding      : Disable
Conn Standard      : -                    Max Down Rate       : 0xff
ExpExchSeq         : Expanded             Framing structure   : Framing-3
TxAttenuation(dB)  : 0                    Coding Gain         : Auto
TxBinAdjust        : Disable              RxBinAdjust         : Disable
TxStartBin         : 6                    TxEndBin            : 31
RxStartBin         : 32                   RxEndBin            : 255
Fast Retrain       : Enable               Esc Fast Retrain    : Disable
MaxBits/bin On Rx  : 15                   Bit Swap            : Enable
Dual Latency       : Disable              Pmode               : Enable
Pilot Request      : Enable               Last Failed Status  : 0x0
Oper Status        : Startup HShake       Startup Progress    : 0xa0
AC Mode item       : fbm                  AC Ttr R Offset     : 0
AC Pilot Request   : Enable               EC Fdm Mode         : FDM
Pwr Mgmt Mode      : L2L3NotAllwd         Profile             : Main
Adv Capability     : Annex A
UpstreamBitswap    : Enable               Memory Mode         : Disabled
UpStreamLatency    : -                    DownStreamLatency   : -
MaxSNR Margin      : Disabled             SRA                 : Disabled
Defaults           : G.dmt                Logging             : Disabled

$_
```

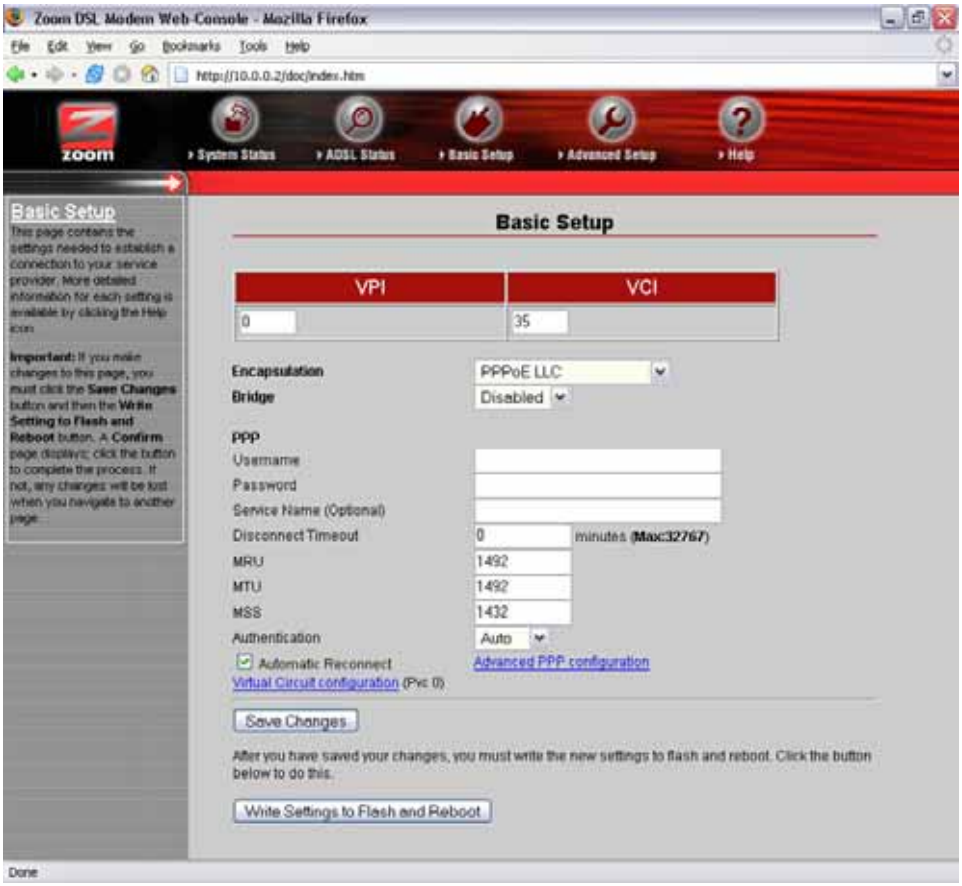
After these settings have been saved to flash memory, the modem configuration ins complete.

C.2.5 Zoom X3 ADSL Modem Model 5560 Setup

To set up the Zoom X3 ADSL Modem Model 5560:

1. Open your web browser and enter http://10.0.0.2 or http://192.9.0.22 to connect to the modem.
2. Login with username = admin and password = zoomadsl.

   The Basic Setup page opens:

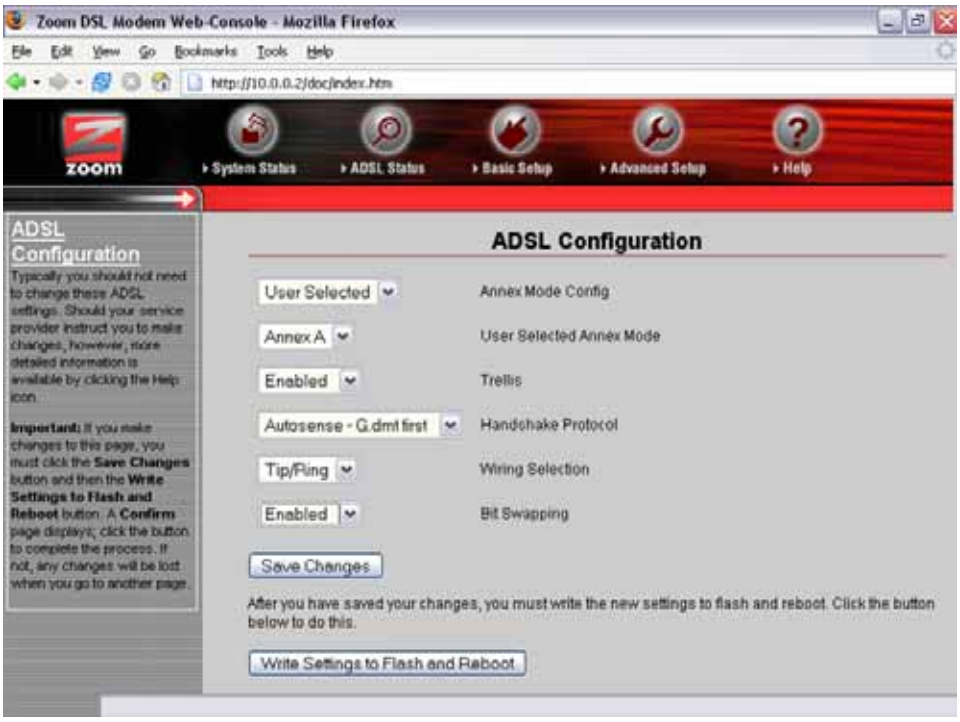


3. Click Advanced Setup.

   The Advanced Setup page opens:

4. Click ADSL Configuration.

The ADSL Configuration page opens:


Zoom DSL Modem Web-Console - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://10.0.0.2/doc/index.htm
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
ADSL Configuration
Typically you should not need to change these ADSL settings. Should your service provider instruct you to make changes, however, more detailed information is available by clicking the Help icon.
Important: If you make changes to this page, you must click the Save Changes button and then the Write Settings to Flash and Reboot button. A Confirm page displays; click the button to complete the process. If not, any changes will be lost when you go to another page.
ADSL Configuration
User Selected
Annex Mode Config
Annex A
User Selected Annex Mode
Enabled
Trellis
Autosense - G.dmt first
Handshake Protocol
Tip/Ring
Wiring Selection
Enabled
Bit Swapping
Save Changes
After you have saved your changes, you must write the new settings to flash and reboot. Click the button below to do this.
Write Settings to Flash and Reboot

5. Make the following ADSL configuration changes:

Bit Swapping = Enabled

6. Click Save Changes.

7. Click Advanced Setup.

8. In the Advanced Setup page, click WAN Settings.

   The WAN Configuration page opens:

9. Make the following WAN configuration changes:

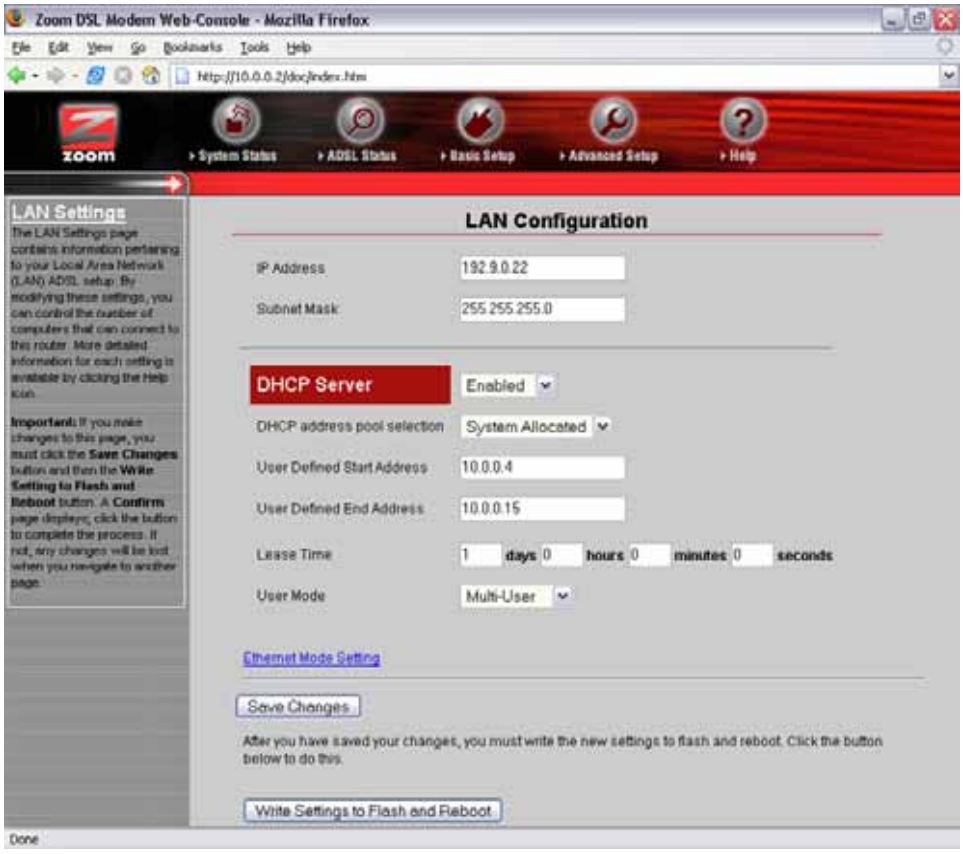
   Encapsulation = 1483 Bridged IP LLC
   Bridge = Enabled

10. Click Save Changes.

11. Click Advanced Setup.

12. In the Advanced Setup page, click LAN Settings.

    The LAN Configuration page opens:


Zoom DSL Modem Web-Console - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://10.0.0.2/doc/index.htm
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
LAN Settings
The LAN Settings page contains information pertaining to your Local Area Network (LAN) ADSL setup. By modifying these settings, you can control the number of computers that can connect to this router. More detailed information for each setting is available by clicking the Help icon.
Important: If you make changes to this page, you must click the Save Changes button and then the Write Setting to Flash and Reboot button. A Confirm page displays; click the button to complete the process. If not, any changes will be lost when you navigate to another page.
LAN Configuration
IP Address
192.9.0.22
Subnet Mask
255.255.255.0
DHCP Server
Enabled
DHCP address pool selection
System Allocated
User Defined Start Address
10.0.0.4
User Defined End Address
10.0.0.15
Lease Time
1 days 0 hours 0 minutes 0 seconds
User Mode
Multi-User
Ethernet Mode Setting
Save Changes
After you have saved your changes, you must write the new settings to flash and reboot. Click the button below to do this.
Write Settings to Flash and Reboot
Done

13. Make the following LAN configuration changes:

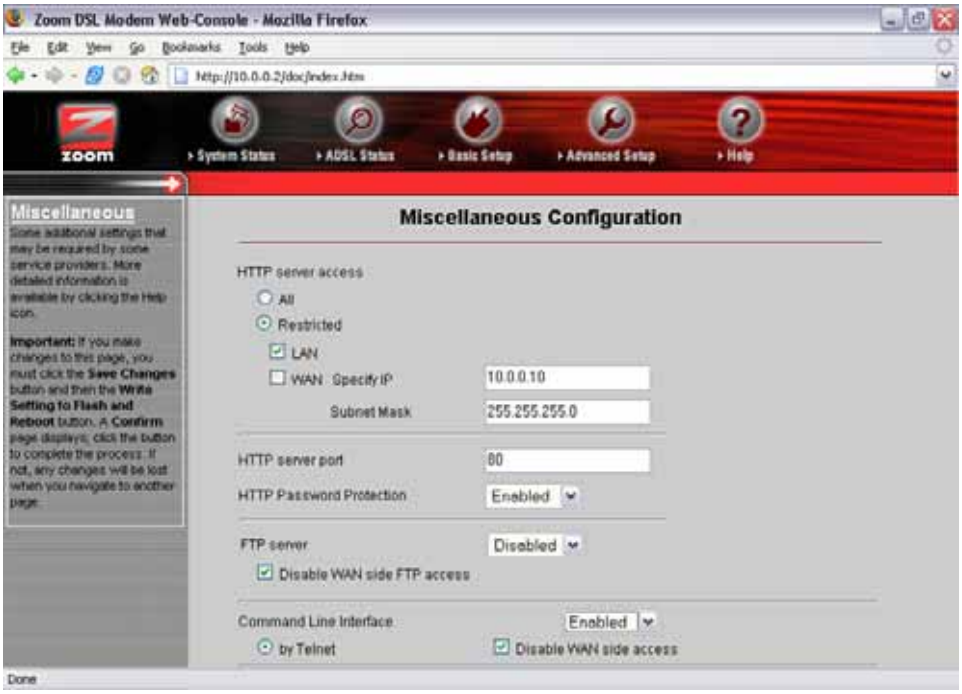
IP Address = 192.9.0.22
Subnet Mask = 255.255.255.0

14. Click Save Changes.

15. Click Advanced Setup.

16. In the Advanced Setup page, click Misc Configuration.

The Miscellaneous Configuration page opens:


Zoom DSL Modem Web-Console - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://10.0.0.2/doc/index.htm
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Miscellaneous
Some additional settings that may be required by some service providers. More detailed information is available by clicking the Help icon.
Important: If you make changes to this page, you must click the Save Changes button and then the Write Setting to Flash and Reboot button. A Confirm page displays; click the button to complete the process. If not, any changes will be lost when you navigate to another page.
Miscellaneous Configuration
HTTP server access
All
Restricted
LAN
WAN Specify IP
10.0.0.10
Subnet Mask
255.255.255.0
HTTP server port
80
HTTP Password Protection
Enabled
FTP server
Disabled
Disable WAN side FTP access
Command Line Interface
Enabled
by Telnet
Disable WAN side access
Done

17. Make the following miscellaneous configuration changes:

Command Line Interface = enabled

18. Click Save Changes.

19. Click Write Settings to Flash and Reboot.

A Confirmed message opens:

Zoom DSL Modem Web-Console - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://10.0.0.2/doc/index.htm
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Advanced Setup
This page includes a number of options for specialized or advanced settings. These options should be configured by users with knowledge of DSL and networking settings or under the direction of a technical support representative.
Confirmed
Note: The Write Settings to Flash and Reboot process will take a few moments. First the modem's front lights will go out, then the LAN light will come on and the LINK light will blink. When the LINK light stays on solid, the flash and reboot process is complete. You can now resume configuring your modem by clicking one of the icons at the top of the page.
Confirm
Done

20. Click Confirm.

The settings are saved and the modem is rebooted:

Zoom DSL Modem Web-Console - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://10.0.0.2/doc/index.htm
zoom
System Status
ADSL Status
Basic Setup
Advanced Setup
Help
Advanced Setup
This page includes a number of options for specialized or advanced settings. These options should be configured by users with knowledge of DSL and networking settings or under the direction of a technical support representative.
Your settings are being saved and the modem being rebooted.
Save-reboot in progress, please wait...
Done

21. Wait 60 seconds and then close your web browser.

During the reboot process, the Zoom modem LINK LED turns off, and after a successful reboot, it starts flashing again.

22. Open your web browser and enter http://192.9.0.22 to connect to the new modem address.

23. Verify that the login succeeds and that the Basic Setup page is displayed, then close your web browser.

C.2.6 Remove Temporary Host IP Address

To remove the temporary host IP address again after configuration, follow the steps in “Adding a Temporary Host IP Address” on page C-5 up to Step 5 to open the Advanced TCP/IP Settings window. Then select the entry for IP Address = 10.0.0.99 and click Remove to delete it from the list. Click OK until done.